DLA-93-P20339

DLA PRE-AWARD CONTRACTING SYSTEM

May 1993

DEPARTMENT OF DEFENSE
DEFENSE LOGISTICS AGENCY
Executive Director (Plans & Policy Integration)
Economic Analysis Team
Cameron Station
Alexandria, VA 22304-6100

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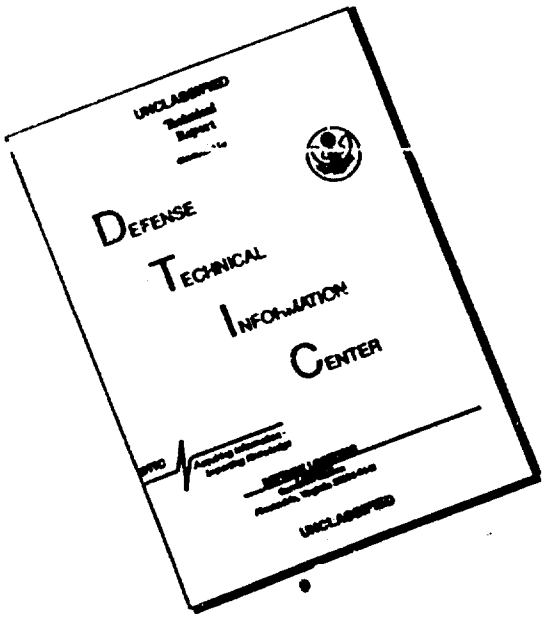

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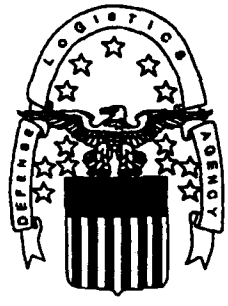

Defense Logistics Agency

DLA Pre-Award Contracting System

Final Economic Analysis
May 1993

KPMG Peat Marwick

Management Consultants

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April 9, 1993

Ms. Jan Rider
Defense Logistics Agency
Building 3 Cameron Station
Alexandria, VA 22304-6100

Dear Ms. Rider:

KPMG Peat Marwick is pleased to submit our final report in accordance with task order F7-04 and Contract F33600-90-D-0223. This report details our analysis, assumptions, methodology, and results. All comments on the draft economic analysis have been addressed; the final economic analysis replaces the draft economic analysis.

We enjoyed performing the economic analysis on this very important topic and look forward to future efforts with DLA. A briefing, as required on the delivery order, can be scheduled at your convenience. If you have any questions or comments, please contact me at (202) 467-3015.

Very truly yours,

KPMG Peat Marwick

Laurence D. Huff, for
S. Daniel Johnson, Principal

ACRONYMS

AIS	Automated Information System
ALT	Administrative Lead Time
ATI	Advanced Technology Incorporated
CBD	Commerce Business Daily
CIM	Corporate Information Management
DBMS	Data Base Management System
DCMD	Defense Contract Management District
DCSC	Defense Construction Supply Center
DESC	Defense Electronics Supply Center
DFAR	Department of Defense Federal Acquisition Regulation
DGSC	Defense General Supply Center
DISC	Defense Industrial Supply Center
DLA	Defense Logistics Agency
DLA-LO	DLA Operations Research and Economic Analysis Office
DLAR	DLA Regulation
DMINS	Distributed Minicomputer System
DoD	Department of Defense
DORO	DLA Operations Research and Economic Analysis Office
DPACS	DLA Pre-Award Contracting System
DPSC	Defense Personnel Support Center
DPSC (C&T)	DPSC-Clothing and Textile
DPSC (Med)	DPSC-Medical
DPSSO	DLA Performance System Standard Office
FAR	Federal Acquisition Regulation
FTE	Full Time Equivalent
FY	Fiscal Year
GFM	Government Furnished Materiel
GS	General Schedule
I^3	Immediate Improvement Initiative
IOM	Interoffice Memorandum
LAN	Local Area Network
MOCAS	Mechanization of Contract Administration System
MS-DOS	Microsoft's Disk Operating System
NIP	Non Impact Printers
NPV	Net Present Value
OALT	Supply Administrative Lead Time
PALT	Procurement Administrative Lead Time
PDP	Project Development Plan
PR	Purchase Request
PTR	Problem Trouble Report
RFP	Request for Proposal
RFQ	Request for Quote
SAMMS	Standard Automated Material Management System
SAMMSTEL	SAMMS Telecommunications System
SF	Standard Form
SPD	Special Purpose Data

List of Exhibits

ECONOMIC ANALYSIS
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ECONOMIC ANALYSIS
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EXECUTIVE SUMMARY

This economic analysis of the DLA Preaward Contracting System (DPACS) is one of three studies being provided to the Defense Logistics Agency (DLA) under KPMG Peat Marwick delivery order F7-04 of Contract F33600-90-D-0223.

Our report is in accordance with the concepts of DLA Manual (DLAM) 7041.1, *Economic Analysis*, of May 1985, and OSD *PA&E Draft Guidelines*, but is tailored to meet the following specific client specific requirements:

- analyze existing historic economic profiles of DPACS, which were prepared at various stages during system development,
- review systems implementation through fiscal year 1992, and document actual systems cost and, where possible, actual benefits realized, and
- project remaining implementation and recurring costs for the period fiscal years 1993 through 2001, and estimate benefits for the same period.

Following these steps, we provide comparisons and return on investment/payback calculations.

Introduction and background

DPACS is an on-line interactive system that automates procurement development, review, approval, solicitation, and award functions at the DLA supply centers. The system operates on a three-tier architecture: microcomputer workstations, a minicomputer data repository, and an IBM mainframe. Prototype development started in 1985, was certified in 1987, and a major reengineering effort took place in 1988. At present, the reengineered DPACS has been installed fully or partially at all the supply centers. Reengineered DPACS initial operating capability (IOC) occurred in 1991 at the Defense Industrial Supply Center (DISC).

Methodology

The study team researched a broad base of existing DPACS functional, statistical, and financial data. Extensive interviews were conducted with representatives from DLA Headquarters (HQ), DISC, the Defense General Supply Center (DGSC), and other Inventory Control Points (ICP). Continuous interaction was maintained with DLA DPACS developers and users for data input, verification, clarification of assumptions, and interpretation.

The steps we followed in executing our study approach parallel the organization of our report, which describes the DPACS premodernization economic profile, documents actual cost and benefits to date, and projects future cost and benefits.

Premodernization baseline

The study team was provided with historical documents, which describe, at different points in the DPACS development cycle, anticipated benefits of DPACS. Exhibit 1-1 summarizes the key points of the documents. As shown, original estimates of personnel savings ranged from 220 to 401 full-time equivalents (FTE) after implementation of DPACS, and estimates of lead time savings from 12 to 21 days. Documenting the estimated costs of DPACS that paralleled those benefits estimates proved difficult. The only document of the four examined that contained cost data was the Milestone I analysis conducted in December 1988. This study contained cost estimates for a total of 12 system modernization initiatives, of which DPACS

Exhibit 1-1
Summary of Benefit by Source Document

Source	Date	Personnel Savings	Annual Cash Personnel Savings	Lead Time Savings	Annual Cash Lead Time Savings
1. SAMMS Preliminary Economic Analysis	June 1984	220 FTE	Not Costed	12 Days	Not Costed
2. SAMMS I 3 Milestone I (FY 88 $)	Dec.1988	363 FTE	$9.5 recurring	12 Days	$21.5 non-recurring 4.2 recurring
3. SAMMS I 3 Milestone II (FY 90 $)	March 1990	401 FTE	$11.5 recurring	21 Days	$43.6 non-recurring 7.8 recurring
4. SAMMS I 3 Milestone II Update (FY 90 $)	Oct. 1991	401 FTE	$11.5 recurring	21 Days	$17.7 non-recurring 3.2 recurring

was one. The I^3 analysis documented 3 different cost scenarios based on varying degrees of functionality, of which Alternative 2 most closely resembles the DPACS that was eventually developed. Costs in this report were aggregated, however, by functional elements such as hardware, software, program management, etc. The only cost elements that differentiated requirements by individual system were hardware and, to a lesser extent, software development. The study team identified DPACS specific costs and allocated nonspecific system costs on the basis of the percent of DPACS identified costs to Alternative 2 identified costs to arrive at a macro estimate of total cost. Exhibit 1-2 is a summary of that allocation, identifying the incremental costs for the implementation of DPACS against the status quo baseline, which in the Milestone I document was presented as Alternative 0.

Exhibit 1-2
Original Estimated Incremental DPACS Costs (FY 88 $000)

SAMMS Milestone I	
Milestone I, Alternative 2 Cost	$733,690
Milestone I, Alternative 0 Cost (Baseline)	543,059
Total Milestone I Incremental Cost	$190,631
Milestone I DPACS Incremental Cost	$73,857

Actual and future costs and benefits

Exhibit 1-3 is a summary of actual costs incurred through fiscal year 1992 and projected through fiscal year 2001, as well as actual/anticipated benefits. Investment costs will continue for final implementation at the remaining two ICPs at Defense Personnel Support Center (DPSC), the personal tier conversion (discussed in section 6 of this report), the CDA effort required to port the system from Unify to Oracle, and hardware replacement. Hardware maintenance will be the largest component of the recurring costs. Initial system benefits began accruing in fiscal year 1992 with successful system implementation at four of the six ICPs. Based on interviews, a review of standards, and an analysis of performance data, the study team projects a steady state savings of 286 FTE personnel and 10.5 days of lead time DLA-wide after full DPACS implementation and operation.

This report assesses the benefits associated with the costs required to achieve baseline functionality. Future functionality required by the CIM Procurement Council for transformation to a DoD standard system will require additional investment, which should

provide additional benefits to DoD. The added functionality will result in additional spending and should increase benefits realized, however, this analysis does not include these costs and benefits. Appendix G provides a more detailed explanation.

Exhibit 1-3
Actual/Future Costs and Benefits

	FY 87-91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	TOTAL	Excluding Sunk
Costs													
Investment	$22.42	$2.54	$1.80	$2.43	$1.57	$3.74	$1.59	$0.68	$0.33	$0.72	$2.94	$40.76	$15.80
Recurring costs	$2.84	$0.75	$0.84	$1.16	$0.90	$0.49	$0.35	$0.38	$0.46	$0.44	$0.27	$8.89	$5.29
Total Costs	$25.26	$3.29	$2.64	$3.59	$2.47	$4.23	$1.94	$1.05	$0.79	$1.16	$3.22	$49.65	$21.10
Costs (FY 93 $$)	$28.85	$3.42	$2.64	$3.59	$2.47	$4.23	$1.94	$1.05	$0.79	$1.16	$3.22	$53.36	$21.10
Savings (FY 93 $$)													
FTEs			286	286	286	286	286	286	286	286	286		
Personnel Savings		$0.76	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$83.43	$82.67
Paper reduction		$0.01	$0.05	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.53	$0.53
Lead time (One-time;10.5 days)		$0.00	$2.47	$1.87	$0.75	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5.08	$5.08
Lead Time (Recurring)		$0.00	$0.20	$0.35	$0.41	$0.41	$0.41	$0.41	$0.41	$0.41	$0.41	$3.39	$3.39
Total Savings	$0.00	$0.76	$11.90	$11.46	$10.40	$9.65	$9.65	$9.65	$9.65	$9.65	$9.65	$92.44	$91.67
Net Savings/(cost)	($28.85)	($2.65)	$9.25	$7.87	$7.93	$5.42	$7.72	$8.60	$8.86	$8.49	$6.43	$39.07	$70.58

Summary

A summary comparison of the benefits estimated in previous analyses is shown in Exhibit 1-4 against the costs from the I³ Milestone I document. A comparison of these costs and benefits to our revised update is provided in Exhibit 1-5.

Exhibit 1-4
Historical Cost and Benefit Projections

	Total	Total w/o Sunk
Incremental DPACS Cost (FY 88 $$)	$73.9	$65.9
FY 93 $$	$88.1	$78.7
Milestone I Savings (FY 93 $$)		
Total Benefits	$189.1	$189.1
Net Savings/(cost)	$101.0	$110.4
Discounted Savings/(cost)		$58.4
Sunk costs (FY 85-88)		
Milestone II Savings (FY 93 $$)		
Total Benefits	$220.6	$220.6
Net Savings/(cost)	$132.4	$141.9
Discounted Savings/(cost)		$83.2
Sunk costs (FY 85-90)		
Milestone II (Update) Savings (FY 93 $$)		
Total Benefits	$148.5	$148.5
Net Savings/(cost)	$60.4	$69.8
Discounted Savings/(cost)		$42.7
Sunk costs (FY 85-90)		
Current analysis (FY 93 $$)		
Total Benefits	$92.44	$91.67
Net Savings/(cost)	$39.07	$70.58
Discounted Savings/(cost)		$47.70
Sunk costs (FY 87-92)		

As shown, system cost derivation for the DLA Milestone I document were significantly higher than fiscal year 1993 current analysis/update when converted to constant fiscal year 1993 dollars. The original estimate equates to $88.1 million versus a revised estimate of $52.36 million from our findings and analysis when sunk costs are included. The disparity is largely the result of reduced recurring training requirements and reduced hardware investment and maintenance costs since the Milestone I document due to new generations of technology and new DLA contracts for procuring them.

Benefits comparisons show an even wider variation. This reduction is driven chiefly by our revised estimate of personnel savings of a 286 FTE reduction, as opposed to previous estimates of a 401 FTE reduction across DLA. This is the result of more accurate measurements of DPACS benefits quantified by DPSSO's analysis of preaward and award functions after implementation of DPACS, that were not available to earlier benefit estimators.

Exhibit 1-5
Financial Ratios ($ FY 93 million)

	Milestone I	Milestone II	Milestone II Update	1993 Actual/Projected
Cost	$78.7	$78.7	$78.7	$21.1
Benefits	189.1	220.6	148.5	91.7
Net Savings	$110.4	$141.9	$69.8	$70.6
Discounted Net Savings	$58.4	$83.2	$42.7	$47.7
Internal Rate of Return	85%	213%	103%	N/A
Payback (years)	2.4	2.2	2.6	0.3
Savings/Investment Ratio	2.5	2.6	1.6	5.3
Base Year	1988	1990	1990	1993
Sunk Cost Years	FY 85-88	FY 85-90	FY 85-90	FY 87-92

Other factors accounting for part of the differences in benefits are reductions in lead time savings estimates, from 21 days to 10.5, and cost saved per day of lead time, down to $1.11 million per day from $1.80 million in previous estimates. These changes reflect realities that have been borne out by government-wide and DLA specific events that have occurred since the initial SAMMS I[3] estimates.

The Milestone I document estimated DPACS incremental cost at $78.7 million, fiscal year 1993 dollars, excluding sunk costs (FY 85 - FY 88). At the same time, benefits were estimated at $189.1 million, fiscal year 1993 dollars, resulting in a net savings of $110.9 million, fiscal year 1993 dollars. When discounted to fiscal year 1988, the net present value was $58.4 million (fiscal year 1993 dollars). Furthermore, the Milestone I document estimated that the discounted payback would occur in 2.4 years (excluding sunk costs) and the savings investment ratio was 2.5. These data represent an internal rate return (IRR) of 85 percent (excluding sunk cost).

The Milestone II document increased total benefits 77 percent to $220.6 million (fiscal year 1993 dollars), but did not address costs (we have extended the Milestone I estimate for illustrative purposes). The result of an increase in sunk costs and an increase in benefits lowered the discounted payback to 2.2 years, increased the savings to investment ratio to 2.6, and increased the internal rate of return to 213 percent.

In the update to the Milestone II document, benefits were lowered 33 percent to $148.5 million (fiscal year 1993 dollars). Again, this analysis did not address costs, and again Milestone I costs were used for illustrative purposes. The net result is an increase in the discounted payback period to 2.6 years, a reduction in the savings to investment ratio to 1.6, and a reduction in the internal rate of return to 103 percent.

The current analysis estimates that actual and future costs total $21.1 million (fiscal year 1993 dollars). Associated benefits are estimated at $91.7 million (fiscal year 1993 dollars). The payback has been lowered to less than one year and the savings to investment ratio increased to more than 5. The internal rate of return is incalculable because no year shows a net cost. This is primarily due to the elimination of sunk costs.

While these data cannot be compared to each other because each analysis was performed at different points in time of the development life cycle, some points are evident. First, the net present value of the project was positive during all four points in the analysis. Secondly, the savings to investment ratio was greater than one at all points of the project.

ECONOMIC ANALYSIS
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INTRODUCTION AND BACKGROUND

The objective of this study is to update the economic profile of DPACS implementation, and compare that update to previous historical economic estimates conducted at various stages in development of the system. The general steps we take to accomplish this objective are to:

- identify, analyze, and discuss the historical government cost and benefit estimate data related to DPACS. Historical cost and benefit data are provided in Section 4, Premodernization Baseline.

- research and document actual incurred costs through fiscal year 1992 related to DPACS. Analyze implementation experience at those sites operating DPACS and assess the benefits of the system operation. This discussion is provided in Section 5, Incurred Costs and Accrued Benefits.

- project future DPACS costs and benefits through fiscal year 2001 based on actual experience and forecasting analysis. Our projection is discussed in Section 6, Future Costs and Benefits.

The balance of this section provides an introduction to DLA functions and processes impacted by DPACS, and a description of the system.

DLA supply support mission

DLA manages, procures, and distributes approximately 3.5 million consumable items used by the military services and other Federal agencies. In acquiring these items, the agency awards over 1.2 million procurements annually. The first-tier infrastructure used to manage this effort in the six DLA supply centers is shown with each center's commodity responsibilities in Exhibit 2-1.

In fiscal year 1991, the military services began transferring an additional 1 million consumable items to DLA to centralize distribution management. This transfer of items should be complete in fiscal year 1994.

Procurement

Although DPACS operation peripherally affects the functions of supply, quality assurance, and cataloging/technical services, the system primarily impacts the contracting and production directorate of the supply centers. Each contracting and production directorate processes purchase requests; issues solicitations, orders, and contracts; and performs postaward contract administration functions to support customer requirements for locally administered awards.

Contracting missions and functions

Each supply center has its own contracting and production directorate with a site-specific organization and mission. DISC has the most experience with DPACS operation, and was the focus of the study team's effort. Although each site has its own individual characteristics, the directorate's general mission does not vary substantially from site to site. DISC manual 5810.1, part IV, defines the DISC Directorate of Contracting and Production mission as: "Acts as the principal advisor and assistant to the Commander in directing the accomplishment of responsibilities for providing contracting and production support for all supplies and services assigned to DISC for central acquisition; support of DLA, DoD, and civil agencies as defined in Interservice Support Agreements; and local purchase support for assigned activities."

Exhibit 2-1
Supply Center Commodity Descriptions

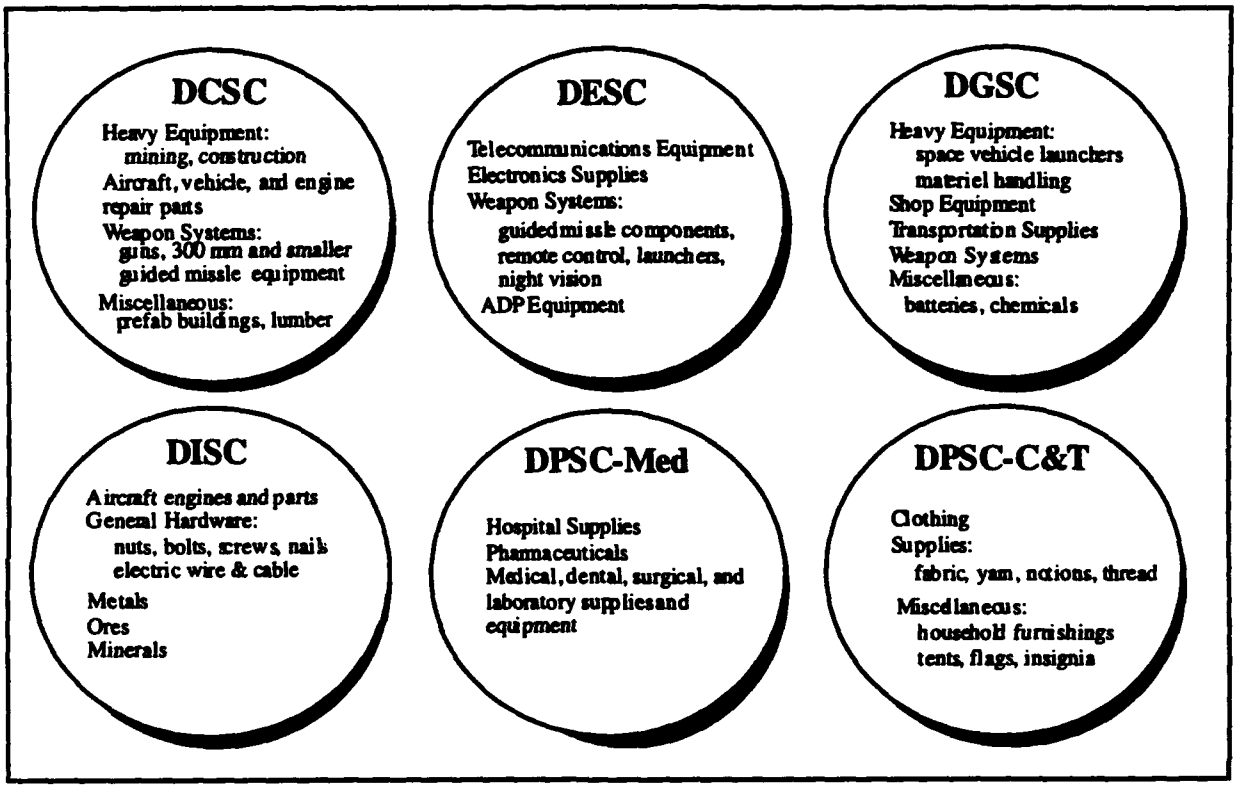
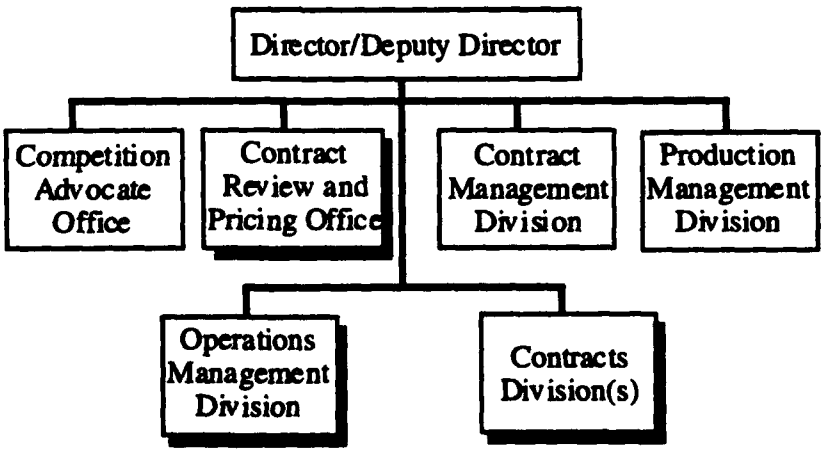


Exhibit 2-2 outlines the basic structure of the DISC Directorate of Contracting and Production. Offices and divisions that have been directly impacted by DPACS implementation are highlighted in the illustration. The Contract Review and Pricing Office is responsible for any analysis related to the price reasonableness of a vendor quote received on a solicitation.

Exhibit 2-2
Directorate of Contracting and Production - DISC-P



Most DPACS users are located in the Contracts Division. This division has numerous functions related to the preaward and award processes performed in DPACS including issuing solicitations, receiving offers, evaluating bids and/or proposals, awarding contracts, and issuing delivery and purchase orders. Buyers working in the Contracts Division prepare synopses of proposed solicitations and awards for the Commerce Business Daily (CBD); this can also be accomplished through DPACS. The Directorate of Contracting and Production is also responsible for other functions including contract administration, resolving problems with deliveries and/or contract deficiencies, and modifying contracts.

The Operations Management Division performs most support functions including supplier mailing list and contractor performance history maintenance, price history accumulation, document distribution, and preparation of solicitation and award package documentation. Most postaward actions are handled in the Production Management Division. Postaward actions may be necessary to correct, add, or delete clauses; cancel an award; or make changes after contract award because of quality or technical issues.

DPACS operational description

DPACS systems development started in 1985, with prototype installation and initial operation at DISC in 1987. In 1988 a major reengineering effort took place to correct prototype deficiencies and modify the system's architecture. The first modified system was installed at DISC in 1990 with IOC following in 1991. Exhibit 2-3 shows the DPACS installation schedules for all the DLA centers.

The rest of this section briefly describes DPACS. A more detailed functional description is provided later in our study. DPACS is an on-line interactive system that automates procurement development, review, approval, solicitation production, and award functions at most of the supply centers. All data required by the buyer or contracting supervisor is provided on-line. The buyer can review purchase request data, access supporting information related to the buy, view vendor data, and electronically refer the purchase request to outside sources. The system electronically refers purchase requests (PR) to a supervisor for on-line approvals. DPACS operates on a three-tiered architecture system. The lower tier consists of a microcomputer running under Microsoft's Disk Operating System (MS DOS), the midtier consists of a Gould minicomputer serving as the main data repository and the upper tier is an IBM compatible mainframe that runs the current SAMMS application. DPACS is comprised of the following components:

- PR management
- referrals
- vendor inquiry
- presolicitation evaluation
- solicitation document production
- bid/quote entry and award choice
- award document production
- policy maintenance
- table maintenance
- supervisor functions

The components can be broken down into four major categories; preaward, evaluation, award, and support functions. Exhibit 2-4 illustrates these components and demonstrates the flow of data from the mainframe to the minicomputer to the individual workstations operating DPACS. DPACS follows a logical sequential order in that the tasks associated with the first seven components are generally performed in order.

Exhibit 2-3
DPACS Implementation Schedule

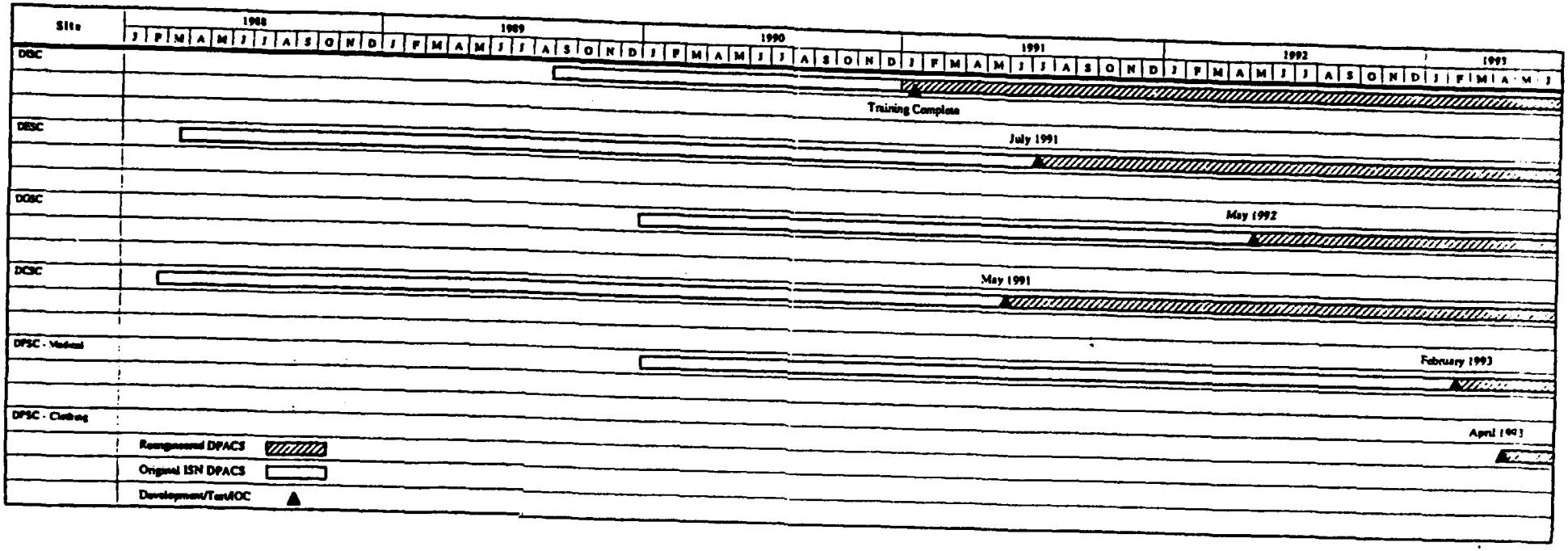
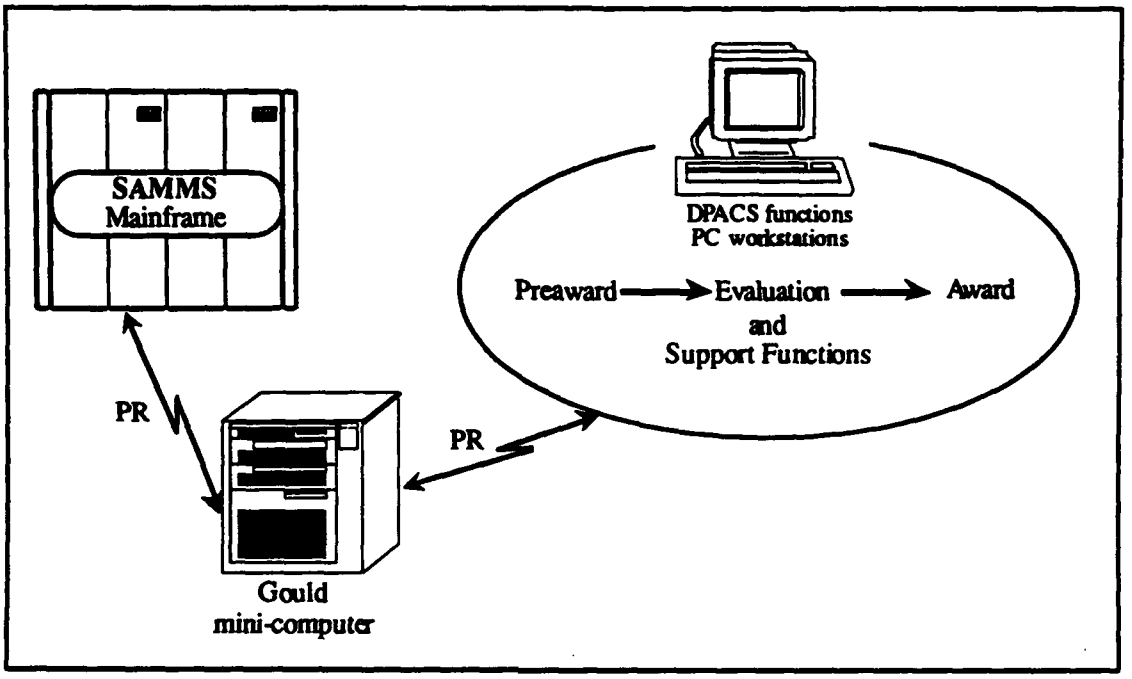


Exhibit 2-4
DPACS Configuration



DPACS was one of two systems selected as migration systems for the Department of Defense (DoD) by the Corporate Information Management (CIM) procurement council. The council evaluated a host of contracting systems and presented its findings on December 15 and 16, 1992. From both functional and technical perspectives, DPACS was ranked above all other systems. DPACS was recommended as the migration system for "procurement functional activity" DoD-wide activity. Further explanation is provided in the following section of this report.

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ANALYSIS METHODOLOGY

Our approach to conducting this study was to:

- identify, analyze, understand, and reformat historical cost and benefit data associated with DPACS development and installation. DLA provided several documents and other less formal inputs for this step.
- review the impact of DPACS implementation to date. As initial DPACS installation occurred in 1991 at DISC, this site was the primary focus of the actual effect DPACS was having on the procurement process.
- project the balance of costs to be incurred and benefits to be realized as DPACS is fully installed at all six supply centers, based on actual observation of implementation to date.

Historical DPACS economic documentation

The study team identified several historical DLA documents that totally or partially described estimates of costs to develop and implement DPACS, and benefits that would be realized from system implementation. These source documents differed significantly in their assumptions, inclusion, project life, format, and extent of formal preparation. The following is a brief summary of each.

SAMMS Preliminary Economic Analysis (June 1984)

DLA provided the study team with an interoffice memorandum that estimated DPACS would save 220 full-time equivalents (FTE) and 12 days in administrative lead time (ALT). The cost of DPACS was not addressed. In interviews with DLA Contracting (DLA-P) staff, this estimate received their support when compared to subsequent benefit estimates.

SAMMS Immediate Improvement Initiative (I^3) Milestone I, Concept Development Phase (December 1988)

This study was conducted to support the SAMMS I^3 Modernization Major Automated Information System Review Council (MAISRC) decision. In this document, DPACS was one of 12 subsystems addressed as part of the SAMMS Improvement Program. Of all the documents the team reviewed, this Milestone I document was the only source of system cost data; however, cost was not organized by system (e.g. DPACS), but by function (hardware, software) for all systems. In section 4, Premodernization Baseline, we describe our methodology for segregating costs of DPACS from total cost contained in the I^3 document. This cost stream forms the basis for comparison of historical costs. Benefits were identified and quantified by subsystem in the Milestone I analysis. It was estimated that DPACS would save 363 FTEs and 21 days in ALT.

I^3 Benefits Analysis, Milestone II (March 1990)

The benefits portion of the Milestone I document described above was updated in draft form for the SAMMS I^3 Milestone II MAISRC. No systems cost data were included in this report. The Milestone II update estimated savings of 401 FTEs and 21 days in ALT as a result of DPACS.

***Benefits Quantification for Enhancements to Selected Automated Information Systems* (October 1991)**

This unpublished draft study was an update to the Milestone II report previously discussed. It contained no change to FTE or ALT days saved owing to DPACS.

The above documents are referenced frequently throughout the balance of our report when making comparisons to previous estimates. Extensive interviews were conducted with DLA staff who were involved in preparation of these studies to verify and confirm our interpretation of data.

Other data sources

Appendix A contains a list of all documentation reviewed during the course of this study. The study team witnessed a live demonstration of the system and analyzed functional descriptions, workload statistics, and staffing plans. Interviews were conducted with DPACS experts and representatives from DLA headquarters (HQ), DISC, DGSC, and several other supply centers. DLA HQ, DLA Operations Research and Economic Analysis Office (DORO), and DLA Performance System Standard Office (DPSSO) were consulted to discuss cost analysis and standards as well as benefits realized to date. A list of all individuals interviewed is provided as Appendix B.

Benefit estimation

Our approach to estimating benefits was to document, where possible, actual changes in personnel and ALT, reconcile those findings with pre- and post- DPACS DPSSO standards for those functions affected, and combine them with estimates and projections of key DPACS managers and users in the field. We interviewed users who were knowledgeable about DPACS and users who were familiar with processes prior to DPACS implementation. This allowed the study team to identify differences in how tasks were performed manually and with DPACS. The interviews generally focused on how the implementation of DPACS changed the way the supply center performed its workload.

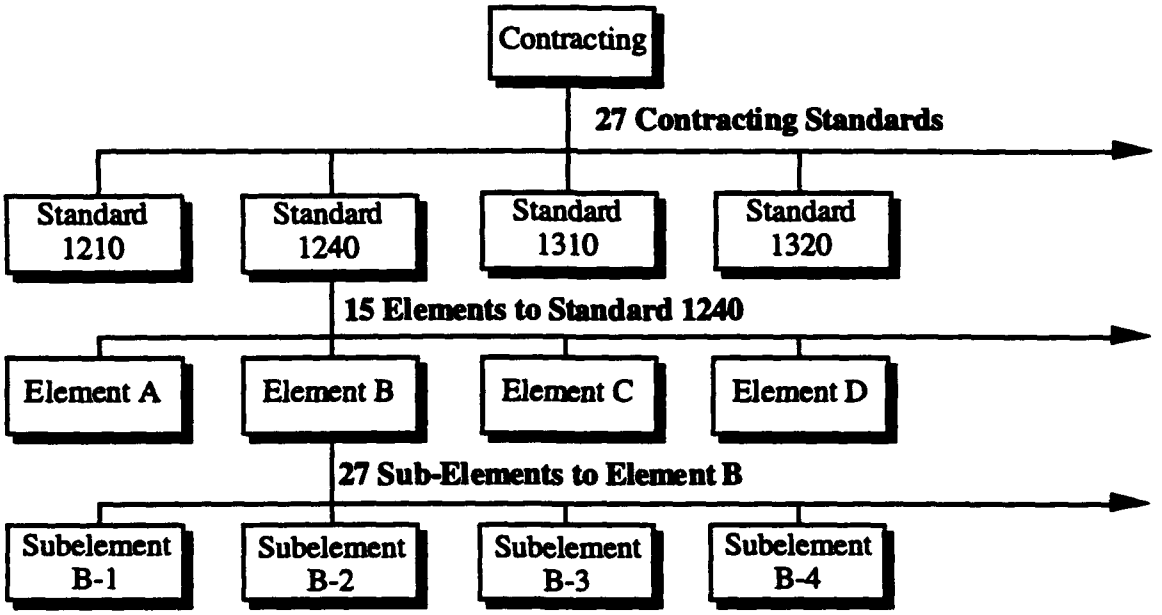
Benefits quantified in this report are associated with identified costs. As DoD migrates to a CIM baseline system, additional costs will be incurred. Associated with these costs should be additional benefits.

Standards

Among its many tasks, DPSSO, located in Richmond, Virginia, develops and maintains work measurement standards. DPSSO performs classic time and motion studies for a variety of functions (supply, contracting, etc.) in which they observe the processes performed by DLA personnel. Based on these observations, activities are grouped into like categories, or standards, which consist of multiple elements. Each element is then divided into subelements, which are in turn further divided into sub-subelements. One example is the process for awarding a large contract. The standard for this process consists of 15 elements. Element "B" is divided into 27 subelements, each of which is further divided into several subelements. The standard for processing a large award is one of six standards for the contracting personnel at a supply center. The components of a standard are illustrated in Exhibit 3-1.

Actual performance of each element and each of its subordinate elements are observed over time, and a standard time is developed. The standard time can be based on observation, time study tables, or a host of other mechanisms. Once a time standard is developed, it is multiplied

Exhibit 3-1
Components of a DPSSO Standard



by a frequency of occurrence factor to arrive at a "normal" time. The frequency of occurrence is based on the number of times the element is performed during the whole process. As a result, DPSSO has a normal time that it should take to perform a given process (e.g. to process a large award -- standard 1240). This time represents the DLA base time. This time is then modified center by center to adjust for unique activity requirements processes.

For the purposes of this analysis, the DPSSO standards were analyzed for the periods before and after system deployment to observe the elements that were eliminated and which functions affected the time required to perform given functions.

Lead time quantification

A major element of the benefits associated with DPACS is the reduction of lead time. Exhibit 3-2 illustrates the main components of lead time as related to DPACS. ALT can be further subdivided to three main categories: Supply Administrative Lead Time (OALT), Referrals, and Procurement Administrative Lead Time (PALT). DPACS directly affects PALT.

This analysis assumes that a reduction in lead time to acquire an item results in a corresponding reduction in inventory required to be on hand. Once the number of days of lead time has been identified, a dollar value is associated with the number of days of lead time saved. The economic effect is similar to that of selling an asset and having a one-time cash infusion. Thus, a one-time reduction in working capital is associated with the safety level reduction. The estimated value of one day of lead time has fluctuated widely in the historical studies reviewed. For purposes of this effort, DORO supported our study by updating input data for fiscal year 1991 and 1992 actuals, and recalculating the per day lead time savings using the same approach used in their October 1991 benefits update. A copy of their effort is included in Appendix C.

Exhibit 3-2
Components of Lead Time

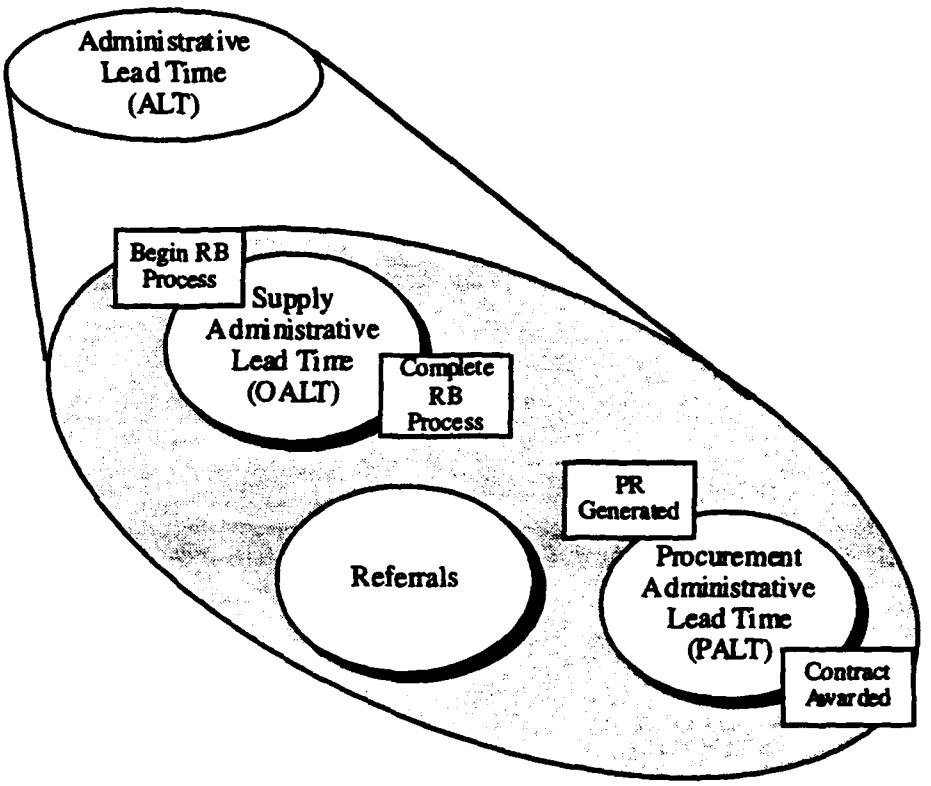


Exhibit 3-3 provides supporting detail for a per day savings of $1,143,714. In addition to one-time safety level savings, our study also assumes an associated recurring savings related to the one-time reduction in inventory. This recurring savings has been estimated at 8 percent of the one-time savings annually; 1 percent for storage costs and 7 percent for obsolescence. Because we have adopted the working capital reduction methodology (the one time savings), no recurring savings associated with investment costs were included.

Exhibit 3-3
Dollar Value of a One-Day Reduction In ALT

FY 92 Safety Level Savings Due to Reduced Lead Times

Site	Current Safety Level ($000)	Reduced Safety Level ($000)	Safety Level Saved ($000)	Safety Level Reduction Per Day ($000)
DCSC	$5,389	$3,657	$1,732	$49
DESC	14,657	10,495	4,162	119
DGSC	10,687	7,398	3,289	94
DISC	20,910	16,162	4,748	136
DPSC-Med	8,227	5,472	2,755	79
DPSC-C&T	145,943	122,599	23,344	667
DLA	$205,813	$165,783	$40,030	$1,144

While DORO supported the analysis by providing the one-time dollar per day of lead time savings, additional research was conducted by the study team to determine when the one-time savings would occur. Based on the October 1991 report, one-third of the one-time reduction was expected to be realized in the first year, one-forth in the second year, and one-tenth in the third year. The assumption in the October 1991 report stated that, "These one-time savings occur gradually as DLA makes its first buys and then receives stocks for these items. Due to long supply, some of these stocks may never be bought again." Therefore, DLA estimated that only 68 percent of the one-time savings would be realized. The percent realized was based on old statistics obtained from DLA-OSF.

Because the environment surrounding the DLA purchasing and IM functions has changed dramatically over the past several years, the team held discussions with DLA-LO and OSF to determine when and to what extent one-time savings associated with decreased inventory levels would be realized. Based on current practices, it was mutually agreed that 60 percent of the ratios identified in the October 1991 analysis would be realized. This is based on the historical DLA reality that often times stock is not replaced regularly, allowing a reduction in ALT to result in a direct cash savings through stock level reduction. While this does not imply dead stock, it does imply that DLA may be in a long supply position due to environmental factors such as the CIT and Operation Desert Storm. Exhibit 3-4 illustrates the time phasing used in this analysis.

Exhibit 3-4
Lead Time Phasing

	Year 1	Year 2	Year 3
October 1991	.333	.250	.100
Environment Factor	.600	.600	.600
Current Analysis	.200	.150	.060

Electronic folder sizing

Data for each PR reside on the midtier (minicomputer) in an electronic folder. When a buyer works on a PR, the electronic folder for that PR is downloaded to the buyer's workstation. The size, in terms of memory, of the DPACS electronic folders is a system implementation issue. While most folders are downloaded to the buyers' workstations with little difficulty, complex procurements have proven to be too large to be downloaded to the workstations. If a folder cannot be downloaded, the PR must be processed manually. Exhibit 3-5 illustrates that at present time only 80 kilobytes (KB) of net available memory are on the existing Zenith Z-248 workstations.

Exhibit 3-5
Workstation Net Available Memory

Element	KB of Memory	
Total Addressable Memory		640
Constant Memory Utilization		
Configuration and Support Files	90	
PC NFS Drivers	40	
DPACS Interface Software	310	
Initialized Data	80	
Total Constant Memory (used)		520
Variable Pointer Overhead	40	
Net Available/Useable Memory for Data		80

In March 1992, DLA performed a study to assess the impact of this limitation. The study analyzed the size of electronic folders during fiscal year 1991 and estimated size and frequency of need for large folders in the future. Exhibit 3-6 shows that after full DPACS implementation at all centers, approximately 7 percent of the workload will be too large to process on current DPACS workstations and will have to be completed manually.

Exhibit 3-6
Fiscal Year 1991 Actual Folder Sizes

	< 80 KB	%	80 KB - 3 MB	%	> 3 MB	%	Total
DISC	162,010	99.5%	814	0.5%	17	0.0%	162,841
DCSC	248,441	90.0%	27,614	10.0%	85	0.0%	276,140
DESC	109,304	92.0%	9,504	8.0%	42	0.0%	118,850
DGSC	240,979	96.9%	7,551	3.0%	32	0.0%	248,562
DPSC	96,144	83.5%	18,848	16.4%	195	0.2%	115,187
Total	856,878	93.0%	64,331	7.0%	371	0.0%	921,580

Several options are being considered by DLA at this time to address the folder size issue. For purposes of this analysis, the costs to correct this deficiency and the benefits it will provide are addressed. Costs are presented in Section 6, and the benefits are incorporated by the use of 100 percent of the workload in benefit calculations.

Review of findings

Information gained from existing documents and separate interviews was compiled, organized, and summarized. This information was then reviewed with supply center personnel for adequacy and reasonableness. The results were presented both verbally and in written form to supervisors and functional managers. Further investigation was conducted as necessary to answer issues raised during the discussion. In an attempt to verify information to the widest degree possible, our findings were then circulated to section managers, branch managers, and operations analysts. In addition to reviews by functional personnel, data gathered during this analysis were also reviewed by representatives from DLA HQ.

Other general assumptions

Base year dollars

Historical cost benefit profiles are shown in the year dollar and timing schedules in which they were originally prepared and are clearly labeled. Current and future estimates and comparisons to other dollar streams are in constant fiscal year 1993 dollars.

Sunk cost evaluated. Sunk costs are included for comparison purposes, but are not used in calculating incremental costs for determination of economic indicators.

Considered only incremental costs. In accordance with Defense Logistics Agency Manual (DLAM) 7041.1, *Economic Analysis*, only incremental costs are considered in the analysis when determining future system costs; therefore, a cost that would occur equally with or without DPACS was not included in this analysis. The purpose of this is to permit a comparison of only the relevant costs and benefits.

Discount rate is 10 percent. In accordance with DLAM 7041.1, a 10 percent discount factor was used for this study. This rate is based on the Office of Management and Budget (OMB) Circular A-94, which has been updated since the commencement of this analysis and now specifies various discount rates for different types of analyses. Because this analysis compares actual costs and benefits to DLA's original expectations of costs and benefits, and because those original estimates were developed using a 10 percent discount rate, the use of a 10 percent discount rate in

this analysis will allow for comparison. However, in anticipation of future compliance with the updated Circular A-94, Appendix D contains a summary of all cost and benefit data using a 3.4 percent discount rate. This rate was extracted from Appendix C of the revised Circular A-94. Since highly unusual inflationary pressures are not expected over the course of the analysis, no additional inflationary effects were incorporated into any part of this analysis.

Benefits loaded at 29.55 percent. Benefits were loaded on the fiscal year 1993 annual salaries at a rate of 29.55 percent, in accordance with DLAM 7041.1. The components of the 29.55 percent benefits loading are:

- 21.70 % retirement
- 1.45 % Medicare
- 4.70 % insurance
- 1.70 % other

Personnel

An average salary for a supply center was not calculated, rather, average salaries were applied to various job titles, (i.e. buyer, procurement clerk, and supervisor). Fiscal year 1993 Federal government general schedule (GS) salaries were used in all calculations. In instances where hours were converted to FTEs to determine savings, an 18 percent factor was added to adjust for sick leave and vacation to ensure compliance with DLAM 4071.1. Fractional FTE equivalents were dropped and savings were rounded down to the nearest whole FTE by major job category within each site. Following are our assumptions regarding average GS-level for the major categories of job titles.

- buyer GS-9
- procurement clerk GS-6
- supervisor GS-12
- postaward specialist GS-7/GS-9

While general and administrative (G&A) costs may be reduced as a result of personnel savings identified in this document, G&A and other indirect cost reductions were not considered as part of this analysis.

Workload

DLA Operations Research Office (DORO), in a January 29, 1993 letter, provided the study team with workload estimates associated with the number of PRs for each supply center. The historical work counts were derived from the "All Active Contract File" and provide the number of PRs for fiscal years 1989 through 1992. Workload statistics were used to estimate FTEs saved as a result of reductions in DPSSO standards. The percentage of total workload for each site was used as a ratio to estimate the number of buyers at each site, based upon the actual number of buyers at DISC. Exhibit 3-7 below summarizes the data used in this analysis.

Exhibit 3-7
Volume of Purchase Requests, FY 89-92

	FY 89		FY 90		FY 91		FY 92	
site	PRs	%	PRs	%	PRs	%	PRs	%
DCSC	334,576	29.16%	307,634	29.74%	338,536	30.87%	266,653	28.60%
DESC	194,088	16.92%	172,551	16.68%	173,193	15.79%	144,231	15.47%
DGSC	225,430	19.65%	218,332	21.11%	235,495	21.48%	206,976	22.20%
DISC	200,805	17.50%	181,656	17.56%	183,506	16.74%	153,031	16.42%
DPSC-Med	162,432	14.16%	129,323	12.50%	141,554	12.91%	138,810	14.89%
DPSC-C&T	29,948	2.61%	24,922	2.41%	24,256	2.21%	22,557	2.42%
DLA	1,147,279	100.00%	1,034,418	100.00%	1,096,540	100.00%	932,258	100.00%

Hardware/software

During the course of this analysis, assumptions were made regarding the acquisition and maintenance of hardware and software. The following subsections outline those assumptions.

Hardware acquisition. During the course of this analysis, midtier and lower tier hardware is replaced. Because DLA has not analyzed the costs and benefits of the various available alternatives for hardware replacement, certain assumptions were made. Specifically, there are several ways the midtier Gould minicomputers can be replaced. One option would be to replace the Goulds with a HP minicomputer from the Navy PRC-HP contract. Another option would be to attempt to modify the Navy's contract to include Unify, thereby eliminating the need to port the system to Oracle. Lastly, DLA could replace its minicomputers with 486 PC file servers. Based on discussions with DLA, this analysis assumes that DLA will replace its Gould minicomputers with HP minicomputers, running Oracle's V7 RDBMS. The cost implications of this assumption are contained in section 6 of this report.

Microcomputers are also being replaced on five year intervals. Some microcomputers have been replace with 386s from the Desktop III Contract and others with 486s from the Army SMC Contract. For the purpose of this analysis, future replacement of microcomputers will be with 486s.

While replacing older technology machines, such as the Gould NP1s and Zenith 248s, with current technology such as the HP 9000/877 and the 486 processors, provides DLA with more current technology, these actions are considered replacements (technical upgrades), not enhancements. DLA-ZS provided this assumption based on current DLA-ZO plans.

Hardware maintenance. Because DPACS runs in a three-tiered architecture, maintenance costs exist for three levels of computing: mainframe, minicomputer, and microcomputer. At the mainframe level, no costs have been attributed to DPACS because mainframe maintenance is not an incremental cost. The mainframe will require maintenance with or without DPACS. At the minicomputer level, each site currently runs one minicomputer dedicated to DPACS. The annual maintenance for this type of hardware was estimated based on DLA-Z analysis showing that average maintenance costs per minicomputer per year were $96,000 in the I^3 analysis and $120,000 at present due to the obsolete nature of most machines. Maintenance for the HP 9000/877 was established using existing contract data as identified in section 6 of this analysis. The maintenance expense associated with the microcomputers requires a more detailed explanation.

Microcomputers, like everything else mechanical, eventually break down and need technical support. Since DPACS is a distributed system, buyers and other ancillary users use a microcomputer on a regular basis. In order to estimate the cost of maintaining microcomputers, several resources were tapped. Because DLA does not purchase any form of vendor-provided maintenance when purchasing microcomputers, microcomputer maintenance is treated as an expense; when a microcomputer breaks, a service order is drawn up and a third party is brought in to perform the repairs. In order to estimate microcomputer maintenance expense, industry documentation sources were used.

According to *PC Week*,[1] the average annual maintenance for microcomputers and peripheral devices (including printers) is approximately 5 percent of the investment cost. For a $3,000 microcomputer this represents $150 a year. This estimating tool was validated through additional sources. However, it was noted that expenses in the fourth or fifth year of the device's life would probably approximate 6 percent owing to the age of the item.

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[1] PC Week, Vol. 5, Issue 43, page 70.

For the purposes of this analysis, it was assumed that there would be no maintenance associated with the first two years of the useful life of the microcomputer or printer purchased after fiscal year 1991. This is based on the fact that DLA has been procuring from two contracts (Desktop III and SMC) that include a two-year warranty. It was further assumed that expenses in the third year of the unit's life would approximate 5 percent of the investment cost and the final two years of the five-year useful life would approximate 6 percent. Workstations procured prior to the Desktop III contract did not receive the benefit of a warranty and were assumed to bear the 5 percent maintenance fee for each of the first two years of operation life. Exhibit 3-8 illustrates the maintenance cost per year for microcomputers and printers.

Exhibit 3-8
Microcomputer/Printer Maintenance Cost - Post FY 91

Year 1	Warranty
Year 2	Warranty
Year 3	5 percent of investment
Year 4	6 percent of investment
Year 5	6 percent of investment

Software acquisition. Based on the assumptions contained in the hardware acquisition portion of this section of the report, certain software acquisition assumptions were developed. Because DLA will acquire minicomputers from a contract that comes with Oracle, it is assumed that Oracle's run-time version will be acquired at the same time.

Software maintenance. As a result of DPACS implementation, software maintenance at DSAC has increased. Due to DLA's cost collection procedures, an actual amount of labor associated with software maintenance was unavailable. In order to estimate software maintenance, two sources of information were pursued: the SAMMS project development plan (PDP) and interviews. Maintenance is tracked in the SAMMS project development plan for SAMMS as a whole (including DPACS). The total effort budgeted in the current PDP for maintenance and customer assistance was 210 work months, or 17.5 FTE. Based on interviews with DSAC personnel, it was determined that DPACS accounts for approximately five percent of the budgeted SAMMS workload, which translates to just under 1 FTE. For the purpose of this analysis, it was assumed that in fiscal year 1994, 3 FTEs are associated with DPACS software maintenance at an annual burdened cost of $69,870 per person in fiscal year 1993 dollars. This level of effort will be needed to address outstanding problem reports. For fiscal years 1995 and on, one FTE is associated with software maintenance.

Steady state

The extent of future real world changes that may affect the DPACS environment is not predictable with any degree of certainty. Therefore, this analysis assumes that the mission served by DPACS will proceed similarly to current operations, not withstanding the perception that the Defense environment is changing.

Workload. While issues such as force draw downs and base realignment and closure are reducing current workload, most centers are increasing workload due to phase I of the Consumable Item Transfer (CIT). While troop draw downs may outweigh the impact of the CIT, troop draw downs may only result in a lower quantity of goods requisitioned, not necessarily fewer requisitions. Therefore, this analysis assumes that the overall level of work performed on DPACS will remain relatively stable from fiscal year 1993 forward.

System

Estimates of future system costs and benefits are based on system functionality as of the date of this study. The study team realizes that modifications affecting system functionality are currently under study at DLA and DoD.

Electronic folder size. As discussed previously in this section, DLA is in the process of analyzing possible solutions to the limitation of folder sizes. Section 6 addresses the costs associated with this issue.

DoD Standard System. In the *Report on the Functional Surveys*, 15 December 1992, DPACS was chosen by the CIM Procurement Council as the DoD standard system for contracting. The Council went through a rating process to determine which system(s) had the optimum functionality. DPACS was rated highest, scoring 68 out of a total possible 100 points. The migration system will consist of DPACS as it consists today, plus the functionality required to bring the score up to 100. Since the specific technical and functional requirements for the future CIM system have not been fully scoped, the costs and benefits of the standard system cannot be identified at this time. Section six and Appendix G of this analysis describes some of the perceived differences between DPACS today and the standard system.

ECONOMIC ANALYSIS
OF THE
DLA PRE-AWARD CONTRACTING SYSTEM

CONTENTS

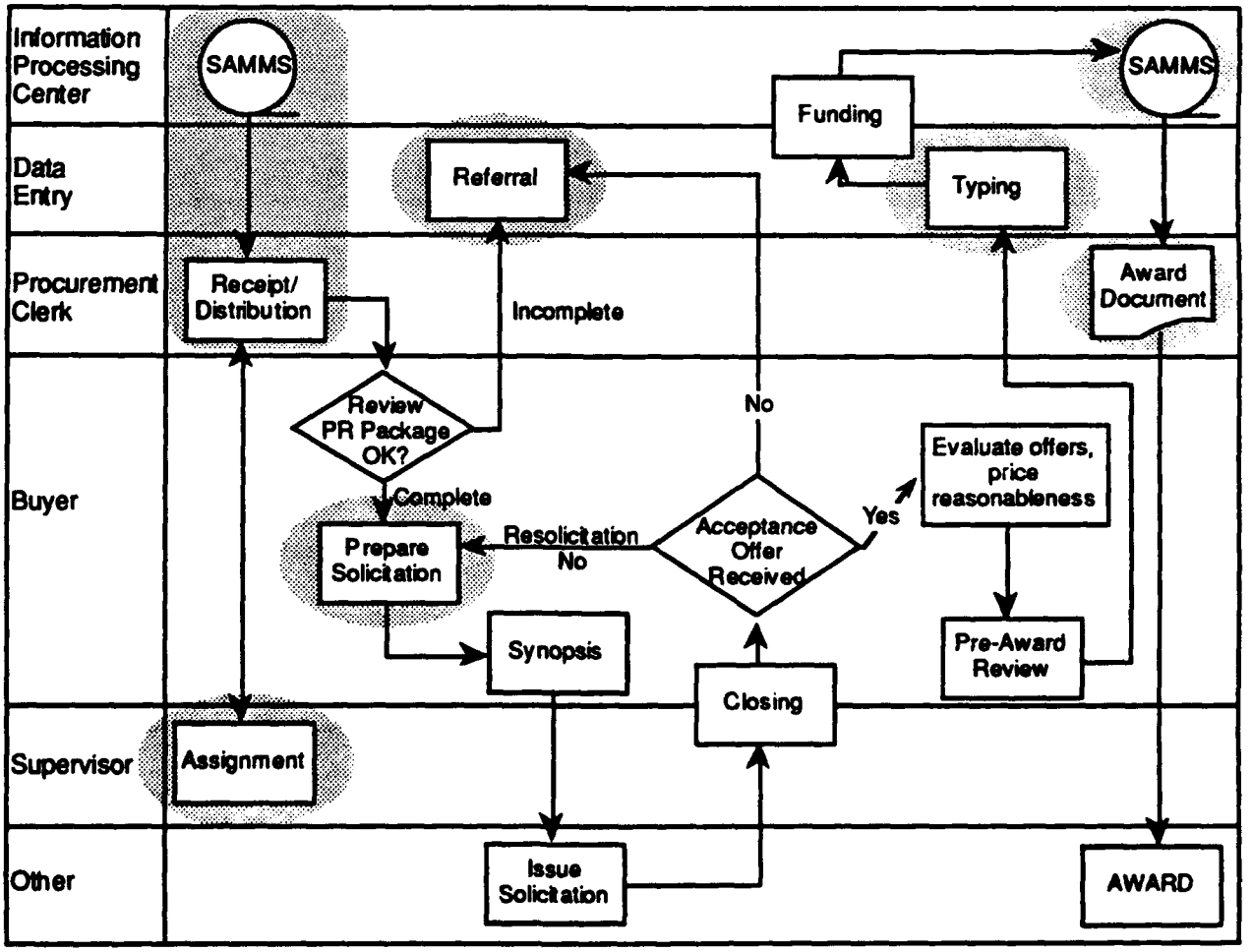
PREMODERNIZATION BASELINE

This section describes the functional processes that comprise procurement, discusses planned DPACS application to those processes, and documents DLA's original estimates of the costs and benefits of the system.

Functional processes of procurement and contracting

Given the procurement workload at the DLA supply centers, the PR-to-contract award cycle was a labor intensive process prior to the implementation of automated tools. These functions included processing PRs and issuing solicitations, delivery/purchase orders, and contracts. In addition, the directorate performed postaward contract administration functions for locally administered awards. These processes were performed in a manual manner, with information passed to SAMMS when necessary. The following subsections outline the processes that were used to produce a solicitation and award prior to the implementation of DPACS. Exhibit 4-1 is a flowchart of the process. At the time this flow chart was initially developed, the small purchases processed in the fashion illustrated in Exhibit 4-1 were between $10,000 and $25,000. Due to changes in the FAR/DFAR, some of these processes are no longer performed for small purchases (under $25,000).

Exhibit 4-1
PR Process To Award (Small Manual)
Average Work Flow Before DPACS



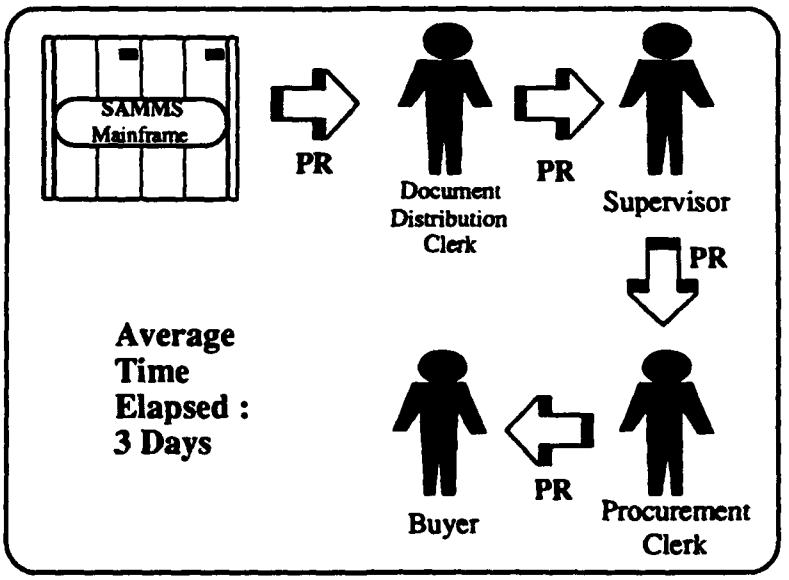
Establish folder

The process started when the Document Distribution Office (DDO) received a PR and trailer data from SAMMS. A folder was labeled and priority coded by the DDO for each PR. The folder, along with PR and trailer data, was then routed to the appropriate division/branch by way of the internal mail system. The buyer used this folder each time a new document, form, or memorandum was produced during the course of the procurement. The buyer would add the new document, memo, or form to the front of the folder, keeping the contents of the folder in chronological order. A buyer could have 300 open PRs, and, therefore, 300 folders to be maintained at his/her desk at any point in time.

PR assignment

Prior to a buyer receiving a PR to process, manual workload assignments were made by a supervisor. The PRs were generated in SAMMS and forwarded to a document distribution clerk. The clerk sorted the PRs by commodity class and division. Supervisors manually received and assigned the PRs to each buyer. After the assignment decisions were made, procurement clerks distributed the PRs to the buyers. The process was cumbersome and required that many different people handle each PR. Exhibit 4-2 illustrates the manual PR assignment process.

Exhibit 4-2
Manual PR Assignment



Presolicitation process

In the presolicitation process, the buyer completed forms such as a DGSC Form 203 (acquisition plan/solicitation work sheet) by copying PR data from the trailer onto the form. The buyer then calculated the milestone dates using date standards, assembled a mailing list, and, for a large solicitation, wrote a Commerce Business Daily (CBD) synopsis, a negotiation justification memo, and a presolicitation notice. These memos, letters, and documents were then typed by the clerical staff and mailed to the vendor by the DDO. Buyers at DGSC and DISC used a unique IV Phase computer to assemble the mailing lists for their procurements. Buyers also added and removed vendors from the list produced by the system. Once the buyer finished assembling the acquisition plan, the relevant portion of the folder was circulated with a

routing slip completed by the buyer to obtain the necessary approvals. Each approver received the acquisition plan form, the mailing list, and the CBD synopsis or waiver form for review. If an approver decided not to approve the plan, the folder was returned to the buyer with comments for modification. The buyer would then make the necessary changes and resubmit the folder for approval. The folder was circulated by way of the internal mail system. The approval process was a serial process; only one approver could review the folder at a time.

Solicitation document production

Once the acquisition plan and the bidders list were completed and approved, the buyer used the Federal Acquisition Regulation (FAR), DoD FAR Supplement (DFAR), DLA Acquisition Regulation Supplement (DLAR), and local clause books to complete the solicitation work sheet. The buyer updated and maintained his/her copy of the clause book with update pages received through the internal mail system. The buyer then replaced the changed page with the new page, removed deleted pages, or added extra pages. Although the mandatory clauses were already selected on the clause work sheet, the buyer had to first choose the appropriate clause work sheet from several options, then select the appropriate optional clauses on that work sheet for inclusion into the final solicitation document. As a result, the final document did not include the actual clause verbiage; it simply contained the clause number that had to be looked up by the vendors upon receipt of the solicitation document. The buyer also completed any "fill-in" portions of the clauses. The buyer sent the solicitation package to a clerk who forwarded the package to the DDO where the selected clauses were included in the solicitation document before assembly, packaging, and mailing. The DDO printed the mailing labels using the most current mailing list submitted by the buyer with the solicitation package. The DDO maintained extra copies of the solicitation document for mailing on request from vendors.

Solicitation amendment production

Amendments to solicitations were sometimes necessary during the procurement cycle. For example, changes in the specifications of the item being solicited or a change in the Request for Quote, Standard Form 18 (RFQ SF-18), opening or closing dates could be required. At other times RFQs could be changed through a telephone conversation. At DGSC and DISC, the buyer used the SF30 (amendment of solicitation) to change the information contained in the solicitation document. The DGSC system assigned the next solicitation amendment number. The buyer listed the question(s) followed by the response(s). Any questions or issues that the buyer could not resolve were referred to other branches. If approvals were necessary, the buyer submitted the SF30 with any supporting documentation, such as the original solicitation document and records of vendor inquiries. The buyer then completed a routing slip to direct the amendment documents to the appropriate approver(s). Once the amendment was approved, the buyer forwarded the amendment to the DDO for packaging and mailing to all vendors on the current mailing list. Each solicitation was also manually proofed by the DDO for typographical errors prior to mailing.

Vendor response

Vendor responses to the solicitations were received at the supply centers. For sealed bids, abstractors opened the bids in a bid-opening room. For negotiated procurements, the buyers wrote the abstracts. The technical section evaluated the offers and alternate offers to ensure responsiveness. The cost proposals from technically responsive vendors were abstracted and evaluated by the cost/pricing section. The cost/pricing section forwarded the abstract to the buyer in the form of a spreadsheet produced on the Fortune computer system.

At DGSC and DISC, the abstracters or buyers completed an abstract form using the evaluation criteria found in the solicitation document. Formulas were applied to the responses to calculate

the lowest bidder (for example, a "Buy American" factor may need to be used for responses from foreign vendors in order to compare them with those submitted by vendors from the United States). The buyer then checked that the vendors' bids, quotes, or proposals were responsive. Once the vendor with the lowest responsive bid was determined, the buyer checked to ensure that the bidder was responsible. This might have required a referral or access to historical data. A referral was made over the phone or with an interoffice memorandum accompanied by the necessary portion of the vendor response and with information from the PR folder. In order to access historical data, the buyer submitted a request to have the folder retrieved from file storage. Often, the buyer's request resulted in a "not-in-file" response.

Proposed award evaluation

Once a buyer identified a responsible and responsive proposed awardee, the buyer gathered any data needed to justify the selection and prepared the award document. The justification might also have required accessing historical price/cost data. The award document was prepared on an SF-33 or SF-26, depending on the number of amendments made to the solicitation documents. When the SF-26 was used, the necessary FAR, DFAR, DLAR, and local clauses were included in the award document. The buyer also prepared any memos to support the proposed award. In the case of a negotiated procurement, the buyer also prepared prenegotiation and postnegotiation briefing memoranda. The buyer submitted the award document to a supervisor for approval, if required.

Award process

The award process began when the buyer received all the necessary approvals for the award document. The buyer would then write a CBD synopsis, if required, and file the award document in the PR/solicitation folder. The buyer would also manually prepare the award work sheet for SAMMS and the DD-350. The buyer would send the DD-350 to the DDO, which forwarded it to DLA HQ. The document input clerks also manually entered each award into SAMMS, after which the award was sent back to the supervisor for signature. Clerks also manually proofed each award for typographical errors prior to mailing.

DPACS objectives

In 1983, DLA authored the *SAMMS Contracting Modernization System Decision Paper*. This document outlined deficiencies in the manual processes, objectives of the modernization project, and requirements for each of the elements of the contracting portion of the SAMMS modernization project. Due to the length of time between the system decision paper and the resultant system, and numerous organizational changes, a map of the original requirements to the current system is difficult. Some of the original requirements have been met in full by DPACS. Other requirements have been met to DLA's satisfaction, but the DoD system may require additional functions. Other requirements were not included to date, but will be satisfied as a result of open PTRs and warmlines. Exhibit 4-3 summarizes these objectives and notes whether the element is currently part of DPACS functionality, whether it is part of planned future functionality, or whether there is a current outstanding PTR or warmline for the objective.

Expected benefits of DPACS

The benefits DLA expected from DPACS included new functional capabilities, improved buyer capabilities, reductions in PALT, and the potential elimination of existing manual processes that were no longer necessary. The following paragraphs outline original DLA benefits that were expected by DLA from DPACS.

Exhibit 4-3
DPACS Objectives/Functions

	Org Rqmt	Current DPACS	PTR/SCR warmline	DoD System
Pre-Award				
Electronic "image" of a PR	✓	✓		
Update the active PR file on-line/print documents as needed	✓	✓		
Reroute referrals to other users, recording return reasons and suspense time	✓	✓		
Electronically build, print, and transmit solicitations, amendments, and synopses	✓	✓		
Receive/store and evaluate contractor bids/quotations, and make awards	✓	✓	✓	
Bank, suspend, or control flow of PRs into procurement to control workload	✓			
PR transaction history	✓	✓		
Interrogate the contracting technical data file on-line (from DPACS)	✓	✓	✓	
Interrogate and maintain an expanded contract history file on-line	✓	✓	✓	
Allow workload measurement and mathematical model simulation (pricing model)	✓	✓	✓	
On-line instructions, procedures, and training aids (Help on-line)	✓	✓		
Electronic contractor general files including past performance and survey data	✓	✓		
On-line access to above data	✓	✓		
Electronic interface with external agencies for solicitations and evaluations	✓		✓	
Automated determination and findings and automated solicitations of bidders	✓	✓		✓
Award				
Fully automated processing of manual PRs, including those in excess of $25,000	✓	✓	✓	
Implement a paperless processing system with on-line entry/funds certification	✓			✓
Electronically transmit award documents to DCMDs and depots	✓			✓
Electronic transmission of the DD-350 as a by-product of award input	✓		✓	✓
Elimination of the hard copy contract folder file	✓			✓
Tailored awards for display or printing	✓	✓		
Electronically transmit complete award abstracts to DCMDs and depots	✓			✓
Workload measurement and mathematical model simulation	✓			
On-line instructions, training aids, and procedures (Help on-line)	✓	✓		
Management reports				
On-line update of the system for management information	✓	✓		
Retrieval, computation, data history, and selective inquiry of mgmt information/statistics	✓	✓	✓	
User-tailored reports	✓			✓
Ensure that all reports generated have consistent and compatible information	✓	✓		
Access, transmit, and receive selected data from directorates outside contracting	✓	✓		
Transmit and access data through the use of shared files	✓	✓		✓
Reports for weapon systems applications	✓			✓
Report capabilities to the normal operating system, simulations, and analytical models	✓	✓		
Capability for optional graphics on all reports	✓			✓
Assistance to the user in formatting and obtaining reports	✓	✓		

Original DLA I[3] estimated functional benefits

DPACS was to provide buyers and other users with an integrated set of office automation functions as well as access to on-line data bases for the FAR, DFAR, DLAR, and local clauses. On-line clause and provision capability was expected to reduce review time and the selection of clauses for solicitation and award production. The system was also designed to provide key word or phrase search capability on the full text of these data bases. By using a central, automated clause data base, there would be less danger of using an outdated clause or provision. Distribution of new or revised clauses would also be an improvement over the paper-bound manual distribution system. DPACS, through integration with SAMMS PR Management, was intended to provide a central data base for procurement data.

Reduction of overall process time

DPACS was expected to provide the buyer with automated tools to facilitate and accelerate many of the functions performed in the procurement process, which are described in detail below.

Word processing. Word processing was incorporated into DPACS to enable the buyer to prepare memoranda and forms from standard paragraphs and text, and to permit rapid editing when corrections or changes were required. Retrieval of "boilerplate" text and the assembly of the necessary form letters and other correspondence made preparation of such items faster and easier.

Electronic spreadsheet. The electronic spreadsheet capability was designed to enable the buyer to make any calculations needed to evaluate bids and make comparisons to standard, projected, or historical figures. Previously prepared spreadsheet templates with validated formulas were expected to provide for faster and potentially more accurate calculations. This should give the buyer time to better examine alternatives in complex bid analyses. The electronic spreadsheet feature was available in the original DPACS, however, was not a part of the reengineered system.

Data base management system (DBMS). The DBMS supported the creation of an electronic folder. The electronic folder provided an interface to a data base for each procurement, which was anticipated to improve timeliness and consistency of data through automatic input to the various documents. The data base contained PR management data so that the buyer did not have to enter it, thereby eliminating possible incorrect entries. The buyer was also able to locate specific PRs from work-in-progress by keys, rather than by searching through stacks of folders. The data base provided a ready source of status information on PRs, such as a PR that had been referred to technical operations or was awaiting branch chief review and approval. The data base included a document checklist, providing the buyer with a quick reference to note that a particular required form or memo was or was not prepared. This checklist should reduce delays caused by missing documents and forms.

Electronic mail. Electronic mail was also included in DPACS to provide instantaneous transfer of documents and data in the electronic folder to other users on the system for review, response, approval, or concurrence. Since the transfer is logical and electronic rather than physical and absolute, documents could be in more than one place at a time. The buyer could continue to work on a folder even after it had been "mailed" to another user. The buyer could also choose to send individual documents or messages to other users. As documents were changed or updated, these changes could also be sent to other users over the electronic mail system. Additionally, electronic mail would provide for quicker distribution of announcements and changes to policies and procedures.

Electronic calendar. An electronic calendar utility provided the buyer with an improvement in time management, facilitated meeting and appointment scheduling, and provided "to do" lists so that important tasks would receive necessary priority. While this function was part of the first DPACS, it was not included in the reengineered version.

Data communications. An external communications interface enabled the buyer to transmit the CBD synopsis and DD-350 electronically. These electronic transmissions were expected to reduce PALT through faster publication of CBD notices, and improve the accuracy of award data by reducing transcription errors in completing the DD-350 and data input to the DLA data base.

Electronic archive. Previous solicitations and award folders could be retrieved from the electronic archives rather than from hard copy files, where they were often "not-in-file" or "lost" in the manual system. Unlike hard copy folders, the electronic files were available to more than one user at a time. This function is currently partially functional according to users interviewed.

Elimination or reduction of existing functions. DPACS made it possible for the user to reduce or eliminate printed outputs. While DPACS provided the buyer with the ability to print any document in the electronic folder, it was anticipated that, as users became more accustomed to the electronic folder, hard copy internal documentation requirements, memos, and folder forms would be reduced. It was hoped that the thick PR folders would be replaced with much thinner paper folders, and that most documents would be stored electronically. "Lost" manual PR archives were expected to be eliminated since losing the electronic folder is less likely than misfiling or losing the hard copy PR file. Also, the buyer would not be responsible for updating and maintaining his/her copy of the FAR, DFAR, DLAR, and local clauses manual, as these volumes would be on-line in a central automated clause data base.

Original DLA I^3 estimates of costs

As discussed earlier, the principal source of original DPACS-related cost data was the SAMMS I^3 analysis conducted in support of the Milestone I decision in 1988. DPACS was identified and analyzed as one of the many I^3 initiatives under four alternative implementation profiles. Alternative 2 of the *I^3 Cost/Benefits Analysis* accurately depicts the configuration that was ultimately developed and implemented. Cost data for all alternatives in the report were presented as totals for all components of the I^3 initiative for the period from fiscal year 1985 to fiscal year 2000. For most cost categories, especially government personnel activities, cost data were not presented as bottoms-up estimates flowing from specific need to quantity of people required, but instead were an allocation of the total complement of DSAC labor on hand. Those not working on development or program management were assumed to be involved with software maintenance. This tended to overstate total expected life cycle costs. Benefits data, on the other hand, were presented for each of the individual systems within I^3. The data contained in this section were taken from Government documents and represent the best estimate of costs and benefits at the time; this data **does not** represent actual costs incurred.

It should be noted that the I^3 Cost/Benefits Analysis estimated the cost to design and implement the DPACS that exists today; the I^3 report did not estimate the costs or benefits that would occur if a DoD standard system was designed and implemented.

Exhibit 4-4 summarizes costs for the total SAMMS I^3 Alternative 2 and 0 options, and the corresponding estimated DPACS costs for each alternative. By subtracting Alternative 0 (the

baseline) from Alternative 2, incremental costs were derived. Appendix E contains additional cost and quantity detail, and illustrates how the DPACS portion of the total incremental costs were developed.

Exhibit 4-4
DPACS Summary Cost
I³ Original Estimate (FY 88 000$)

SAMMS Milestone I	
Milestone I, Alternative 2 Cost	$733,690
Milestone I, Alternative 0 Cost (Baseline)	543,059
Total Milestone I Incremental Cost	$190,631
Milestone I DPACS Incremental Cost	$73,857

Costs were identified as sunk costs for fiscal years 1985 to 1988, and estimates of costs were provided for fiscal years 1989 to 2000. Where identified in the study, DPACS-specific costs were extracted. If DPACS-specific data were unavailable, unit cost data were used to extract DPACS-specific portions of SAMMS total costs. Where data were presented only in the cumulative SAMMS cost, and unit costs were not identified (such as DSAC) SAMMS I³ software development and test and integration staff, an allocation method was used to extract DPACS-specific data. Lifecycle costs specifically identified for each of the five systems that comprise Alternative 2 were totaled, and a percent of the total was calculated based on specifically identified costs. DPACS accounted for approximately 38.7 percent of the costs identified with Alternative 2. This allocation was applied to non system-specific government personnel cost areas such as program management, technical and integration support, test and evaluation, and recurring cost. Exhibit 4-5 is a breakdown of functional costs for DPACS. Appendix E details the identified costs and the methodology for arriving at total incremental costs. The following paragraphs are an element-by-element discussion of DPACS cost rationale.

Exhibit 4-5
DPACS Incremental Cost and Rationale (FY 88 $000)

	Excluding Sunk Cost	Rationale
Incremental Alternative 2	$190,631	
Estimated DPACS Incremental	$73,857	
Hardware	39,783	Unit Cost on replacement cycle
Software	10,619	Allocation, Unit Cost
Software Documentation	457	Allocation
Test and Evaluation	912	Historical Unit Cost
Technical/Integration Support	1,649	Allocation
Program Management	637	Allocation
Other	8,565	Unit Cost, Level of effort, Allocation
Support Investment	3,618	Unit Cost, Allocation
Investment	$66,240	
Recurring Costs	$7,619	Allocation, Unit Cost

Total may not add due to rounding

Investment

Investment costs in the original DPACS estimate represent one-time costs attributable to DPACS implementation and deployment. Where possible, identified unit costs were used as the basis of investment analysis. Where costs other than unit costs were identified, total SAMMS I^3 costs were extrapolated to determine DPACS-specific portions. In the aggregate, these specific and allocated non-specific costs yield total investment for DPACS, originally estimated by DLA to be $66.24 million dollars in constant fiscal year 1988 dollars through fiscal year 2000, as detailed in Appendix E. The following subsections address the original estimate of DPACS investment for hardware, software, software documentation, test and evaluation, technical and integration support, program management, and other areas. As previously described in Exhibit 4-5, cost element calculations were performed by DLA in the Milestone I analysis. The following sections summarize what is included in each element. The actual calculations are contained in the Milestone I analysis and Appendix E. A majority of the costs were developed by DLA using unit costs and the quantity of units required.

Hardware. Hardware costs were estimated in the I^3 report by DLA using unit costs for commercial procurement of Distributed Minicomputer Systems (DMINS), workstations, nonimpact printers (NIP), and local area networks (LAN). The cost data were taken from contracts existing at the time of DLA's analysis. All initial hardware procurements were expected to occur prior to fiscal year 1992. The I^3 cost analysis assumed that full replacement of DMINS would occur after eight years of operation. It also assumed that all workstations would be replaced after a five-year life span. This appears to have been borne out by reality, as Zenith Z-248 80286 computers procured in fiscal years 1987 and 1988 are currently being upgraded to 80386 IBM compatibles. Full NIP replacement was also estimated on a five-year cycle. LAN replacement was assumed to occur on an eight-year cycle at 25 percent of the original purchase price to upgrade network cards and software. DMINS, workstation, and NIP replacement costs were estimated to be the original purchase price, with no reduction for resale value at time of excessing. Using this replacement profile, incremental hardware investment costs associated with DPACS were identified to be $39.78 million in constant fiscal year 1988 dollars over the time frame of the analysis. (See Appendix E for detailed breakout)

Software. Software development for DPACS included both contracted and in-house government effort. DPACS-specific contracted development costs were identified in the *I^3 Cost/Benefits Analysis*. In-house government software development sunk costs and work years through fiscal year 1988 were identified for each component of the SAMMS I^3 effort. The estimates of total SAMMS effort were based on DLA's assumption that 55 percent of the SAMMS-related DSAC staff would be involved in software development during those years. Using the percentage of identified incremental costs associated with DPACS (38.7 percent), DPACS development estimates were allocated from total SAMMS estimates for those years.

As with commercially procured hardware, investment costs for off-the-shelf software were extracted using unit costs identified for commercial workstation and DMINS software. Procurement costs were estimated to occur in conjunction with identified hardware procurement schedules, with new software being procured during each hardware replacement cycle. As a result, total software investment costs were estimated to be $10.62 million in constant fiscal year 1988 dollars over the period of the analysis.

As with hardware procurement costs, these costs may be overstated owing to the DLA assumption that all software will require complete repurchase with the procurement of replacement workstations and DMINS. (See Appendix E for detailed breakout)

Software documentation. The *I^3 Cost/Benefits Analysis* assumed that 10 percent of the SAMMS-related DSAC staff would create documentation during fiscal years 1989 and 1990.

The ratio of DPACS to total Alternative 2 costs used in the analysis of software development costs was also used to extract incremental DPACS-related software documentation costs from the total SAMMS software documentation costs presented in the I^3 report. Documentation for workstation software (ENABLE) and DMINS commercial software was estimated on a unit cost basis with full documentation purchased during software and hardware repurchasing intervals. Incremental government and commercial software documentation investment was estimated to be approximately $0.46 million over the life of the analysis.

Test and evaluation. Test and evaluation costs in the original I^3 DPACS estimate included software and hardware testing. Testing for government-developed SAMMS software was estimated in the same manner as documentation costs. It was assumed that 20 percent of SAMMS-related DSAC staff would test software during fiscal years 1989 and 1990. For the purposes of extracting incremental DPACS costs, the above ratio was also applied to the total software test and evaluation costs. Costs for testing the DMINS and workstations in the *I^3 Cost/Benefits Analysis* were estimated using unit costs developed from past DLA experience. To attain specific DPACS costs, these unit costs were applied to the hardware procurement quantities, including replacements, identified in the hardware investment section. Using these methods, incremental DPACS test and evaluation costs of $0.91 million in constant fiscal year 1988 dollars were identified through the period of the I^3 analysis. (See Appendix E).

Technical/integration support. Costs for government hardware and software integration were estimated along the same lines as test and evaluation costs. The 38.7 percent ratio used previously was applied to determine incremental DPACS-specific costs. SAMMS total cost estimates for fiscal years 1989 and 1990 were generated on the assumption that 10 percent of the SAMMS-related DSAC staff would provide integration and technical support services. It was assumed that hardware contractors would provide in-place integration services for all hardware procurements and replacements, using unit costs from then-current DLA contracts. As a result, incremental technical and integration support costs for the period of the analysis in constant fiscal year 1988 dollars were estimated to be $1.65 million. (See Appendix E).

Program management. DLA obtained estimated SAMMS program management costs by taking total DLA Office of Information Systems and Technology (DLA-Z) staff and apportioning them based on the percentages of workstations and DMINS under DLA-Z attributable to SAMMS in fiscal years 1988 and 1989. It was assumed that the costs for fiscal years 1990 and 1991 would increase to 75 percent of the DLA-Z total and stay at that level through the period of the analysis. However, because these costs were not tied to a system, the 38.7 percent DPACS-to-SAMMS ratio used previously was applied to these costs to develop incremental DPACS program management costs, which totaled $0.64 million in constant fiscal year 1988 dollars over the time frame of the analysis. (See Appendix E).

Other investment costs. The original DPACS cost estimate included a cost category for non-SAMMS staff support in fiscal years 1985 through 1991. Dividing the number of resources at DSAC not related to Automated Information Systems (AIS) by the number of AISs at that time (seven), a SAMMS share was developed. To determine the incremental DPACS share of these costs, the previously derived relationship was used. $8.57 million in constant fiscal year 1988 dollars were attributable to DPACS. (See Appendix E).

Support investment costs. Contractor costs for site preparation for initial DMINS installation were estimated using a unit cost of $50,000 per DMINS, for a total of $300,000 for installation of six DMINS. Incremental initial training costs were also identified as occurring through fiscal year 1991. Contractor- provided workstation and DMINS hardware and software training costs were calculated based on unit costs, which were derived from historical data. Government training support was estimated to involve the remaining 5 percent of the SAMMS-related DSAC staff during fiscal years 1989 through 1991. The percentage

attributable to DPACS was applied to this estimate. Incremental training costs for DPACS during the time frame of the analysis were estimated to be $3.32 million in constant fiscal year 1988 dollars. This yields total support investment costs of $3.62 million. (See Appendix E).

Recurring costs

The original DPACS cost estimate, as interpreted from the *I³ Cost/Benefits Analysis*, included estimates of costs for continuing government software and hardware maintenance, as well as recurring training.

In the *I³ Cost/Benefits Analysis*, DLA did not estimate software maintenance by system. Therefore, the previously described method of allocating incremental costs (DPACS to Alternative 2 ratio of 38.7 percent) was applied. This resulted in an incremental cost reduction of $17.09 million in constant fiscal year 1988 dollars. This cost reduction is based on DLA's assumption that the SAMMS I³ Alternative 2 as a whole will decrease the required DSAC software maintenance effort for SAMMS functions from $165 to $121 million over the period of the analysis.

This savings was partially offset by recurring incremental hardware maintenance which was estimated in a similar manner and represented $14.63 million in additional cost in constant fiscal year 1988 dollars. Incremental recurring training was calculated assuming that each workstation had a single user who required a given amount of training at a certain cost during each year ($9.54 million in constant fiscal year 1988 dollars). The net result of the software maintenance cost reductions and increased hardware maintenance costs and training was a total of $7.62 million over the period of the analysis for DPACS.

Original estimates of benefits

While the SAMMS I³ Milestone I analysis was our primary source of historical DPACS cost data, several sources were found addressing quantified benefits of the system. Exhibit 4-6 is a summary of those sources followed by a discussion of each source.

Exhibit 4-6
DPACS Benefits - Summary by Source
($ million)

Source	Date	Personnel Savings	Annual Cash Personnel Savings	Lead Time Savings	Annual Cash Lead Time Savings
1. SAMMS Preliminary Economic Analysis	June 1984	220 FTE	Not Costed	12 Days	Not Costed
2. SAMMS I 3 Milestone I (FY 88 $)	Dec.1988	363 FTE	$9.5 recurring	12 Days	$21.5 non-recurring 4.2 recurring
3. SAMMS I 3 Milestone II (FY 90 $)	March 1990	401 FTE	$11.5 recurring	21 Days	$43.6 non-recurring 7.8 recurring
4. SAMMS I 3 Milestone II Update (FY 90 $) (Benefits Quantification for Enhancements to Selected Automated Information Systems)	Oct. 1991	401 FTE	$11.5 recurring	21 Days	$17.7 non-recurring 3.2 recurring

Personnel Savings

According to the *I³ Cost/Benefits Analysis, Milestone I*, DPACS should reduce the number of steps required to process and award a purchase request and should automate many of the

remaining tasks, reducing the amount of required labor hours. Calculations for the quantification of these savings were presented in the *I³ Cost/Benefits Analysis* using special purpose data (SPD) standards for pre- and post-DPACS deployment tasks, assuming a constant workload. These savings were aggregated to determine the total work force reduction in work years per fiscal year. These calculations led to an estimated 363 work year reduction per fiscal year for all DLA supply centers combined if the DPACS initiative was implemented for all functions, excluding subsistence. It was assumed that all savings would be for personnel with a GS 7, Step 5 salary with relevant benefits. Annual savings after fiscal year 1991 were estimated to be $9.50 million in fiscal year 1988 constant dollars, for a total of $94.96 million through fiscal year 2000.

The *I³ Benefits Analysis, Milestone II*, dated March 27, 1990, updated the benefits associated with DPACS. The Milestone II document analyzed both personnel and lead time savings in a manner similar to the Milestone I document.

Personnel savings in the Milestone II document were based on changes in SPD standards. Although the calculations of time savings were not presented, they were described:

> "previous calculations were updated using the latest SPD standards and the 1990 General Schedule (GS) pay rates. Workloads from each center for September 1989 were also used to update the analysis. Each center's workload was listed by monthly workload. To convert the amount of work-hours to work years, a factor of .2000671985 was used (work hours per month times 12 months times 1.18 for leave allowance, divided by 2087 work hours per year). From these worksheets, it was determined that 401 work years could be saved for each year at this initiative. The current yearly salary for a GS 7 step 5 (the average for the savings involved) is $22,214. Also, a 29.55 % factor was included for fringe benefits."

This resulted in an estimated annual savings of $11.54 million per year for personnel reductions that the Milestone II analysis assumed would begin to accrue in fiscal year 1993.

While the Milestone I and II documents provided estimates of savings, the first documented estimate of personnel savings was contained in the *SAMMS Preliminary Economic Analysis* (June 1984). The results of the June 1984, analysis were presented in an interoffice memorandum (IOM) dated April 24, 1989. According to the IOM, the savings contained in the 1984 preliminary economic analysis consisted of personnel savings of 220 FTEs and a 12 day reduction in ALT. The 220 FTE savings was based on productivity savings of 10 to 15 percent at the supply centers. The IOM went on to say that the Advanced Technology Incorporated (ATI) lead time study increased estimates of ALT savings from 12 days to 21 days and that estimates of 21 days sounded reasonable. However, concern was expressed in the IOM regarding the increase in FTE savings from 220 FTEs in 1984 to the 363 FTE savings mentioned in the *I³ Cost/Benefits Analysis, Milestone I* document. The 363 FTE savings in the *I³ Cost/Benefits Analysis, Milestone I* document was not reviewed by procurement personnel at DLA headquarters.

In an October 1991, report entitled, *"Benefits Quantification for Enhancements to Selected Automated Information Systems,"* DLA again revised the benefits associated with DPACS. The 1991 report used the same methodology for calculating personnel savings as was used in the Milestone II document. However, based on revised SPD standards, personnel savings were estimated to be 401 FTEs. In fiscal year 1990 dollars, this equated to $11.54 million annually.

Administrative lead time

The ALT necessary for processing a procurement request requires DLA to maintain safety levels of stock items that can be drawn on immediately. By reducing the ALT, as DPACS was predicted to do, reductions in the safety levels of stocks could be made, resulting in immediate and long-term item storage savings.

One-time savings. A reduction in the preaward contracting system ALT, resulting from DPACS implementation, would have the immediate effect of a one-time reduction in the safety levels held by DLA. In the SAMMS I[3] Milestone I study, ALT savings from this reduction were originally estimated to be a 12-day reduction in ALT. Each day of ALT reduction was estimated to be worth $1,794,687 in constant fiscal year 1988 dollars based on DORO Project Number 7003, *The Cost of Late Delivery*. The total savings in fiscal year 1991 from the initial 12-day reduction in ALT was estimated at $21.54 million in constant fiscal year 1988 dollars.

PALT was also cited as a quantifiable benefit in the Milestone II document. The Milestone II analysis used the same DORO source as the Milestone I analysis when determining the value of PALT savings. However, the number of days of PALT saved was increased from 12 to 21 days. The increase was based on information contained in a January 1986, lead time study performed by ATI. However, the ATI study identified potential days of PALT savings between 21 and 79 days. While the Milestone II document used the 21-day figure to be conservative, the ATI study did not relate days saved to the DPACS system. The ATI study simply identified ways of saving PALT; some of the changes in process fell under DPACS and some did not. The total savings from the 21-day reduction in ALT was $43.56 million in fiscal year 1990 dollars.

In the October 1991 benefits analysis update, DLA used the PERMES model to present two scenarios giving the dollar value of DLA-wide safety levels. First, the model was run using safety level investment with current PALT. Then the PALT was reduced by 35 days and PERMES was rerun to estimate a reduction in safety levels. The 35 day figure was used because 35 days were estimated to have been saved in the 1990 analysis. The difference in safety levels was then divided by 35 to determine the savings per day. As a result of the DLA analysis, the value of a one-day reduction in PALT was estimated at $1,239,898 in fiscal year 1990 dollars for a total of $17.79 million in fiscal year 1990 dollars. Additionally, savings were time phased over a three-year period.

Recurring benefits. The reduction in PALT that leads to a reduction in safety levels would also result in decreased yearly holding and investment costs for the lower safety levels. In the Milestone I document, it was estimated that the yearly holding costs for a one-day reduction in PALT would be reduced by $351,137 in fiscal year 1988 constant dollars. For the 12-day reduction in PALT that was estimated for DPACS in the Milestone I document, this would result in a $4.21 million (constant fiscal year 1988 dollars) annual savings, beginning in fiscal year 1991. Through fiscal year 2000, annual savings would total $42.14 million in fiscal year 1988 constant dollars.

Based on the new calculation of total PALT savings in the Milestone II document, a new recurring savings was also calculated. This savings was calculated in the same manner as the recurring savings associated with lead time in the Milestone I document ($351,137 per day of ALT reduction times the number of days reduced). After inflating the dollar per day savings from fiscal year 1988 to fiscal year 1990, a new recurring savings of $7.83 million per year was determined.

In the October 1991, benefits analysis, PALT savings were also modified. While the number of days of PALT saved remained unchanged from the Milestone II analysis (21 days), the methodology for determining the value of PALT changed. Recurring savings were estimated to be 18 percent of the one-time savings. One percent of that is attributable to storage, 7 percent to obsolescence, and 10 percent to investment avoidance. This holding cost translates to $152,507 per day of PALT saved.

Summary

Exhibit 4-7 provides a summary of historical cost and benefit data segregated by source document.

Exhibit 4-7
DPACS Historical Costs and Benefits ($ million)

	FY 85-88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	Total	Total Excl. Sunk
Incremental DPACS Cost (FY 88 $$)	$7.9	$6.1	$11.0	$5.3	$3.0	$3.7	$5.9	$7.0	$5.3	$3.2	$5.1	$4.9	$5.7	$73.9	$65.9
FY 93 $$	$9.5	$7.3	$13.1	$6.3	$3.5	$4.4	$7.0	$8.3	$6.3	$3.8	$6.0	$5.8	$6.8	$88.1	$78.7
Milestone I Savings (FY 93 $$)															
FTE				363.0	363.0	363.0	363.0	363.0	363.0	363.0	363.0	363.0	363.0		
Personnel Savings				$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$113.3	$113.3
Lead Time (one time) - 12 days				25.7										25.7	25.7
Recurring Lead Time				5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	50.1	50.1
Total Benefits				$42.0	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$189.1	$189.1
Net Savings/(cost)	($9.5)	($7.3)	($13.1)	$35.7	$12.8	$11.9	$9.3	$8.0	$10.0	$12.6	$10.3	$10.5	$9.6	$101.0	$110.4
Discounted Savings/(cost)		($7.0)	($11.3)	$28.2	$9.2	$7.8	$5.5	$4.3	$4.9	$5.6	$4.2	$3.9	$3.2		$58.4
Milestone II Savings (FY 93 $$)															
FTE						401.0	401.0	401.0	401.0	401.0	401.0	401.0	401.0		
Personnel Savings						$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$102.5	$102.5
Lead Time (one time) - 21 days						48.6								48.6	48.6
Recurring Lead Time						8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	69.5	69.5
Total Benefits						$70.1	$21.5	$21.5	$21.5	$21.5	$21.5	$21.5	$21.5	$220.6	$220.6
Net Savings/(cost)	($9.5)	($7.3)	($13.1)	($6.3)	($3.5)	$65.7	$14.5	$13.2	$15.2	$17.7	$15.5	$15.7	$14.7	$132.4	$141.9
Discounted Savings/(cost)				($4.9)	($2.5)	$42.8	$8.6	$7.1	$7.4	$7.9	$6.3	$5.8	$4.9		$83.2
Milestone II (Update) Savings (FY 93 $$)															
FTE						401.0	401.0	401.0	401.0	401.0	401.0	401.0	401.0		
Personnel Savings						$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$102.5	$102.5
Lead Time (one time) - 21 days						9.7	7.2	2.9						19.8	19.8
Recurring Lead Time						1.8	3.0	3.6	3.6	3.6	3.6	3.6	3.6	26.2	26.2
Total Benefits						$24.3	$23.1	$19.3	$16.4	$16.4	$16.4	$16.4	$16.4	$148.5	$148.5
Net Savings/(cost)	($9.5)	($7.3)	($13.1)	($6.3)	($3.5)	$19.9	$16.1	$10.9	$10.1	$12.6	$10.3	$10.5	$9.6	$60.4	$69.8
Discounted Savings/(cost)				($4.9)	($2.5)	$12.9	$9.5	$5.9	$4.9	$5.6	$4.2	$3.9	$3.2		$42.7

ECONOMIC ANALYSIS
OF THE
DLA PRE-AWARD CONTRACTING SYSTEM

CONTENTS

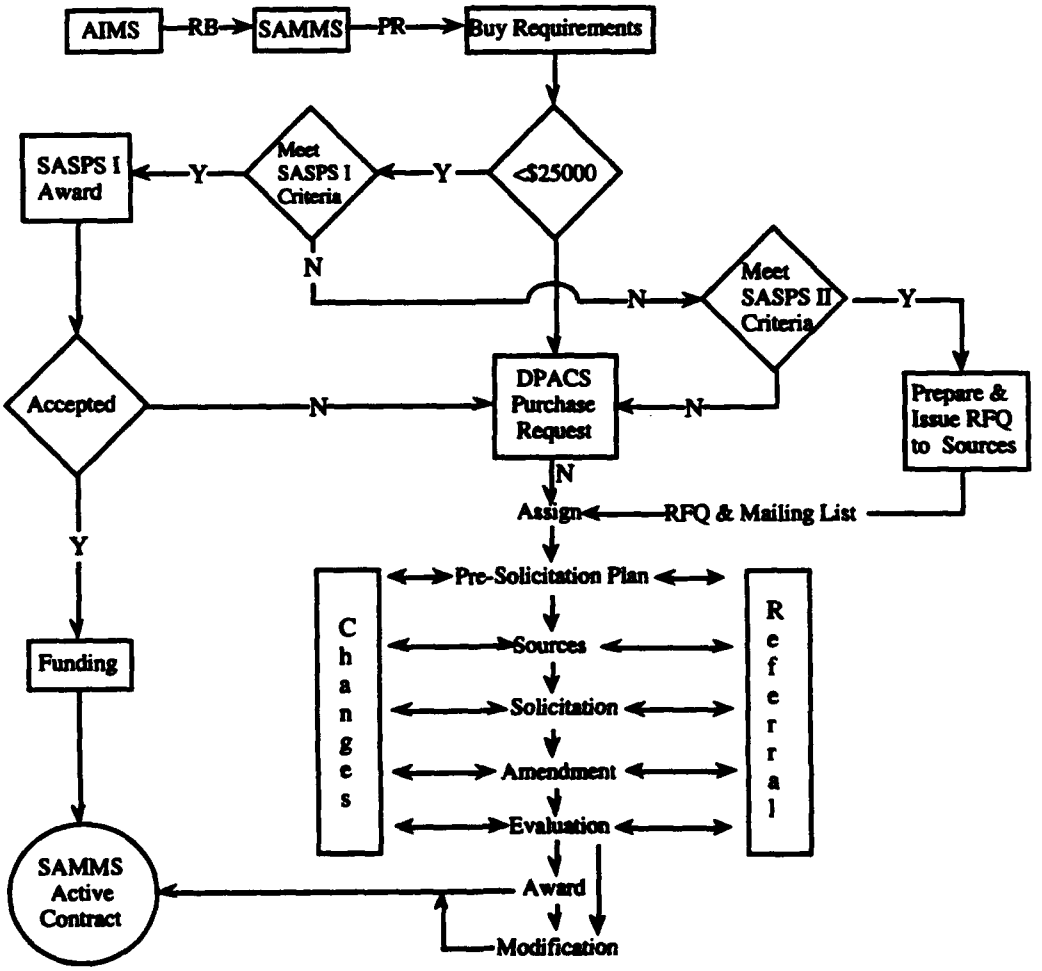
INCURRED COSTS AND ACCRUED BENEFITS

This section describes the functions and operation of DPACS as implemented, actual costs incurred through fiscal year 1992, and benefits realized for the same period.

Purchase request flow to DPACS

Exhibit 5-1 illustrates how a PR becomes a DPACS PR for processing by a buyer. The Automated Inventory Manager Support (AIMS) System generates an approved recommended buy (RB), which is uploaded to SAMMS. SAMMS then generates a PR for the buyer. SAMMS also tests the PR against certain criteria to determine whether the PR can be processed and awarded by the completely automated SAMMS Automated Small Purchase System (SASPS I), whether the PR can be sent to SASPS II for automated solicitation and subsequent processing by DPACS, or whether the PR should be sent directly to DPACS for processing. Later subsections further illustrate the functions that are performed in DPACS.

Exhibit 5-1
PR Flow through the Contracting System

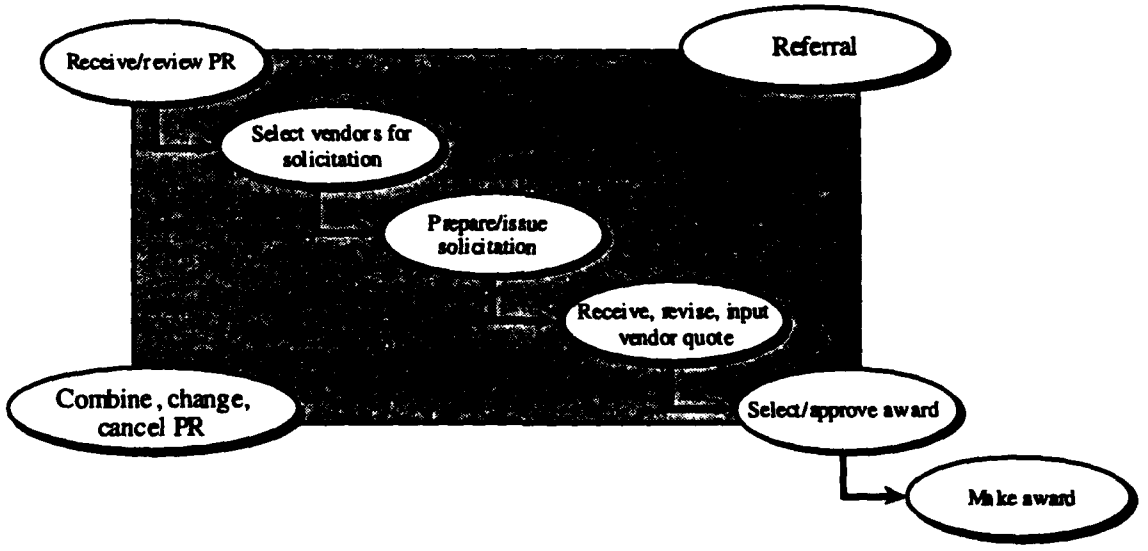


As noted, not all PRs are processed by DPACS. Awards under $25,000 are referred to SASPS I to see if they meet the proper criteria. If they do not meet SASPS I requirements, but the PR is less than $25,000 then they are referred to SASPS II. If they do not meet those criteria they become part of the DPACS workload. Awards processed by the SASPS I system (under $2,500) represented 25 percent of DISC's workload in fiscal year 1992; another 10 percent were between $2,500 and $25,000, and were therefore solicited by SASPS II. All SASPS II solicitation responses are evaluated and awarded by DPACS. The remaining 65 percent of DISC's awards were either over $25,000 (3 percent) or did not meet SASPS II criteria, and were therefore processed by DPACS.

DPACS functionality

DPACS allows the buyer to complete the preaward, evaluation, and award processes in an expedited fashion when compared to the original manual process. At the same time, DPACS increases the quality of both the solicitation and award documents. Because the vast majority of a typical buyer's workload consists of small solicitations and awards (97 percent), the focus of this section will be those related processes, even though DPACS also performs preaward and award functions for large procurements (over $25,000). The basic processes for large awards are similar to those for small awards, but additional procedures are required. The following process description is based on the processes a typical buyer follows to complete a small solicitation and award, as observed at two supply centers. Exhibit 5-2 graphically illustrates the main processes associated with converting a PR to an awarded contract for small purchases.

Exhibit 5-2
DPACS PR to Award Process



Preaward

The buyer begins the day by accessing the PR summary screen in DPACS. The summary provides a listing of all open PRs and contracts. Although all information necessary to begin the solicitation process is available on DPACS, some centers are still receiving and using hard copy PRs to complete the solicitation process. Once the buyer logs on to the system, he/she must analyze the PR data to determine if any further clarification is necessary before continuing. The buyer may have to consult technical and quality, legal, his/her supervisor, or a supply inventory manager (IM) for further clarification on the particular item, vendor, or other issues. This consultation is called suspending/referring the PR and can currently be

accomplished electronically via DPACS, requiring ready access to DPACS by other departments. At some centers, where not all departments have access to DPACS, referrals are still processed manually. At these centers, referrals are performed by phoning or sending an interoffice memo to the other party involved. The buyer would then physically remove the PR file from his/her regular workload and check on it periodically to determine what actions are still pending follow-up information.

Once the buyer has selected a PR to process, clauses for specific contract provisions must be attached. DPACS leads the buyer through a series of questions concerning the PR. Questions are straightforward (e.g., Will it be a large or small purchase and is this a small business set-aside?) and only require that the buyer highlight the correct answers. DPACS will select the appropriate clauses based on the responses. The buyer may have to add additional clauses, but DPACS has built-in "Help" screens to assist the buyer with this process. Once the clauses are selected, DPACS selects the appropriate data to use again in the award process.

Not all centers have installed the same clause selection capabilities. In some instances, an abbreviated question section is included, which results in the selection of only mandatory clauses. In these instances the buyer must manually research and select any optional clauses from a clause book. While an experienced buyer may not have much difficulty with this step, a newer buyer may take up to 30 minutes for each PR, according to one current management estimate. At the centers not utilizing automated clause selection, the manual selection process must be repeated in the award process.

The next step in the preaward process is the compilation of the mailing list of vendors who will receive the RFQ (SF-18). DPACS contains a list of all vendors who have received awards or have expressed interest in providing a particular item in the past. The buyer can select all listed vendors for solicitation, limit the solicitation to only small businesses, and/or add or delete any vendors as deemed necessary. The entire solicitation process to this point typically takes about ten minutes to complete when using DPACS. When performed manually, this same process, took approximately 20 to 30 minutes.

Once the vendors are selected, the buyer must complete the solicitation package. Prior to using DPACS, the process of completing the solicitation package was entirely manual and very cumbersome. The buyer would handwrite the RFQ information on a work sheet, then forward the form to a clerk for typing or hand scribing. Next, mailing labels would have to be constructed for each solicitation, and numerous photocopies made, paired with the appropriate solicitation, stuffed in envelopes, and mailed. Because of the volume of solicitations to be compiled and mailed by the clerks in procurement, this process could take up to six days. Using DPACS, the time has been cut considerably. Once the appropriate data have been entered, DPACS prepares the RFQ automatically and prints it on a laser printer. Each RFQ has a specific vendor's name and address on the form. This eliminates the need for making numerous photocopies and mailing labels. Packages are collected, stapled, and placed in envelopes with address windows. Based on current management estimates, this entire process takes a maximum of three days.

Evaluation

After vendor bids have been received and the solicitation period has closed, the buyer begins the evaluation phase to select an awardee. The buyer accesses a tool in DPACS called the pricing assistant, which is used to determine whether quoted prices are in line with past quotes. The screen provides the buyer with the price history of a particular National Stock Number (NSN). It also provides estimates of what the current price should be and a range of expected high and low prices. Without the pricing assistant, the buyer would have to manually calculate prices based on the producer's price index (PPI) and a variety of other tools. Prior to DPACS it

was common for a buyer to refer quotes to the cost and price group if further analysis was needed, which would often cause a lengthy delay in contract award. Based on an evaluation of the processes involved and interviews with procurement personnel, however, DPACS will not impact the volume of work referred to the cost and price group.

After the quotes are analyzed for reasonableness, the buyer selects the best (lowest) vendor price. At some centers, an additional tool is being utilized: the automated best value manual (ABVM). The ABVM allows the buyer to compare quotes on a more detailed level than price alone. With ABVM, a vendor's past performance and quality are factored into the bid selection process. When the ABVM is used, the buyer enters quotes to DPACS for all bids received for use in both current and future evaluations. When ABVM is not used, only the data for the vendor selected are entered, so historical data are not available for use in future evaluations. Although the data entry requirements with ABVM and DPACS are slightly more cumbersome, the awardee selection is based on more stringent criteria than price alone.

At any time during the evaluation process, a buyer may suspend the PR for referral to another department. For example, if a quote was received for an item with specifications that varied from what the original PR requested, a buyer would refer to technical and cost and price for further analysis.

A buyer may decide to combine PRs. When more than one PR comes in for a specific NSN, the buyer may choose to do one solicitation and award for two or more PRs. By combining PRs, unnecessary duplication of effort is avoided. This can be accomplished at the time of solicitation or, if the vendor will allow a modification to the contract, after the contract is awarded.

Award

Once all final actions are completed and a potential awardee is selected, the award package must be completed; this process is also automated by DPACS. DPACS extracts the necessary data based on what was entered to the system and assigns a contract number to the document. Once the award package is completed, the data are sent by DPACS to the contracting officer or supervisor for approval. (The hard copy package is also forwarded to the supervisor for a signature.) The contract and all associated clauses are printed on a laser printer. After approval, DPACS will verify through SAMMS that funding is available for the contract. In order to verify funding, DPACS transmits pertinent data to SAMMS and results are available the next day. When funding is verified and the contract is signed, the entire hard copy package is sent to distribution for mailing. The original contract is sent to the vendor and a copy is made for filing. This entire process is accomplished in a few days. Prior to DPACS implementation, it was not unusual for three weeks to elapse before the contract was mailed, according to one estimate. In the manual process, after the contract was awarded and approved, the contract package was sent to the Operations Management Division (OMD) for typing and verification of funding availability. When funding was verified, the contract was assigned a contract number, returned to the supervisor for approval/signature, and then sent to distribution for mailing.

DPACS subsystems

DPACS is comprised of ten individual subsystems, which together automate the development, review, approval, and production of solicitations and awards for manual procurements at each of the DLA supply centers. A brief description of the major subsystems of DPACS follows.

PR management. All information required to evaluate a PR is included in the PR management subsystem. The following is a summary of some of the types of information

available to the buyer through the PR management menus. The contract buy history option provides data to assist in establishing pricing trends. Past contracts are displayed chronologically by award date, beginning with the most recently issued contract. The PR management subsystem contains references to past acquisitions and technical and supply data for the item to be procured, including contract history data and item description data. The history of the individual PR is also tracked in this subsystem. All of the stages and events affecting the PR are documented. Status codes are provided to illustrate whether a PR is unsolicited, solicited, in the evaluation phase, pending an award, or awarded. Data on open PRs are included to assist in reaching a decision to combine PRs to expedite an award. The buyer can access information such as the associated IM's name and phone number, and the supply, backorder, and stock-on-hand status for the item.

Referrals. The referral subsystem provides a mechanism for buyers to electronically prepare and submit referrals to the supply, technical operations, or quality assurance directorates. After the directorate personnel have researched the problem, they can return the PR to the buyer's workload with the requested information. The referred PRs screen will display all PRs in a buyer's workload and flag PRs currently referred to another directorate. This subsystem is not currently used by all supply centers.

Vendor inquiry. The buyer can access any vendor information that may be needed through the use of 14 different vendor option menu screens. Buyers can use the vendor inquiry module to review the following vendor data: commercial and government entity (CAGE) code; vendor name, address, size, average sales; and warehouse floor storage space. Data concerning a vendor's response to previously issued solicitations and performance data, including DLA contractors review list (DCRL) information, are summarized. Sources for solicitation can also be researched in this section. All vendors that produce a particular item are listed by CAGE code. The buyer may also access a list of all items by NSN and nomenclature produced by a specific vendor.

Presolicitation evaluation. In this subsystem, the acquisition method and vendors to be solicited are determined and documented by the buyer. A buyer may add vendors to the mailing list, verify the vendor's DCRL status, display or change a vendor's address, or delete a vendor. Although many other screens are available in this subsystem, the main products are the solicitation mailing list and required acquisition plans.

Solicitation document production. In the solicitation document production subsystem, the type of procurement method is determined, clauses and rubber stamp messages are selected, and the solicitation package is formatted and printed on a laser printer by the buyer. The clause selection criteria are a series of questions determined by policy branch personnel at each center. These questions identify the type and dollar value of the solicitation being prepared. The system will select all mandatory clauses, which are flagged with an "M" and cannot be deleted. A rubber stamp may be placed on the solicitation in this phase: when the solicitation is printed it will appear as if a manual rubber stamp was used to add the additional information. The stamp may contain any data that the buyer feels must be highlighted on the front of the solicitation. A solicitation number is paired with the PR at this point; it may be manually added or generated by DPACS. The solicitation number is required before the solicitation can be issued.

Bid/quote entry and award choice. The bid/quote entry and award choice subsystem allows the user to enter the vendor's bids or quotes and choose a proposed awardee. The data entered are collected and tracked in support of the solicitation response analysis process, which requires historical price data. The pricing assistant is also part of this subsystem. The pricing assistant is an artificial intelligence tool that reviews the conditions of the proposed award and identifies any problems or concerns that may affect the award. The pricing assistant may be

used to support the evaluation of all bids entered or to justify the selection of a particular awardee.

Award document production. In this subsystem, the award clauses are selected and filled in by the buyer. The award document can be formatted and printed on a laser printer. In addition, the buyer completes the electronic SAMMS work sheets, which provide the data used to update SAMMS when an award is issued. Work sheets also contain the information sent to the supervisor for approval of the award. The work sheet screens have been designed to detect any inconsistencies in data entry. If there are any errors, the system will automatically display a screen of validation errors. Only when the work sheet is free of errors can it be sent to the supervisor for approval.

Other functions. Policy personnel can input and maintain clauses, word processing templates, field-level help files, rubber stamps, buyer-assisted parameters, screens, and local forms supported by DPACS. The mechanism by which supervisors and management support office (MSO) personnel establish and maintain assignment tables is contained within the table maintenance subsystem. All options available in the table maintenance menu are center-specific. Most centers will have tables that contain NSN assignment data, and buyer, division, branch, and section data. The supervisory/MSO function allows supervisors and MSO personnel to review a buyer's work, make workload and printer reassignments, access management information system (MIS) reports, send data to SAMMS, and review transaction logs.

Incurred costs

Source data for incurred cost aggregation included historical budgets, executed contracts, previous incurred cost accumulation, and interviews with DLA staff. Exhibit 5-3 is a major milestone chart showing implementation status as of the date of the study.

Investment

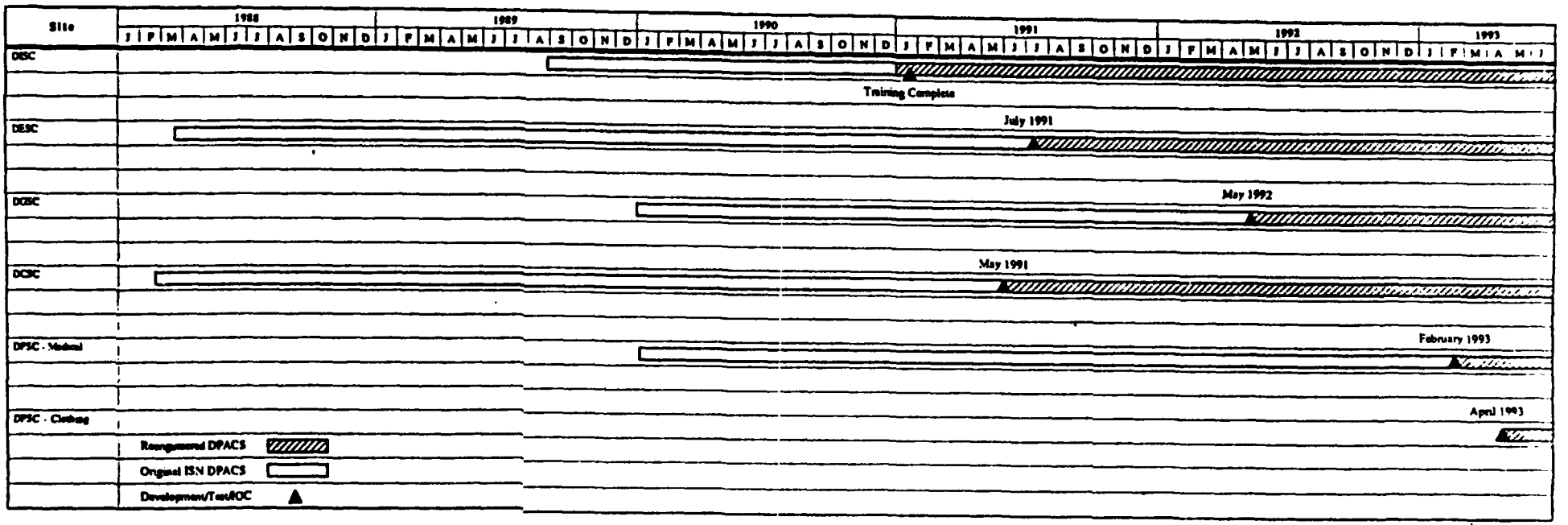
Hardware procurement. Purchases for the reengineered DPACS began in fiscal year 1990 with DISC receiving the initial complement of DMINS connectivity hardware, personal computer workstations, LAN hardware and software, and desktop and network nonimpact printers. Initial Operating Capability (IOC) for the reengineered DPACS was achieved at DISC on March 1, 1991. The DMINS procured for the original ISN-designed DPACS system were incorporated into the reengineered DPACS by KOH Systems and DSAC requiring only connectivity hardware upgrades to the DMINS, thereby eliminating the need to procure new minicomputers for the reengineered DPACS.

Based on research of historical costs and delivery orders in place at the time, not all costs could be accounted for. For example, only two DMINS were identified as sunk costs. However, there are currently five DMINS associated with DPACS DLA-wide. In these instances, unit costs based on historical rates were used to estimate historical procurement costs.

At DISC, the procurement cost of the DPACS minicomputer was $630,730 in fiscal year 1987, plus $10,306 for upgrades in fiscal year 1990. An additional $220,785 was spent for LAN hardware and $1.76 million was spent for the initial procurement of 80286 DPACS workstations. The reengineered version of DPACS was implemented at the remaining hardware centers in fiscal year 1992.

Hardware replacement. At DISC, much of the initial ISN DPACS hardware has outlived its useful life and has already begun to be replaced. In fiscal year 1992, all Z-248 workstations were replaced with 80386 computers procured from the Army Small Multi-user

Exhibit 5-3
DPACS Implementation Schedule



Computer contract at an estimated total cost of $1.55 million, bringing total for hardware to date to $14.18 million. Other sites have begun replacing obsolete hardware.

Software development. Initial DPACS funding and system application development began in fiscal year 1985. A contract was awarded to ISN for the development of DPACS running on dumb terminals linked to newly procured Gould and AT&T minicomputers. DSAC engineers also began system design at that time. The original ISN contract ended in fiscal year 1989, and total costs were $2.97 million based on contract delivery orders.

In fiscal year 1988, DLA awarded a design and implementation contract to KOH Systems for a reengineered DPACS configuration based on intelligent workstations processing awards locally using the ten DPACS modules described in the preceding paragraphs. Total KOH Systems contract costs from fiscal years 1988 through 1992 were $4.28 million, as documented by DLA-Z in delivery orders. A military interdepartmental purchase request (MIPR) for design support was also issued in September 1992, to the Naval Computer and Telecommunications Station-New Orleans, for $0.50 million.

DSAC, as the Central Design Activity (CDA), also employed systems and applications development engineers to design and redesign DPACS during this period. From fiscal years 1985 through 1992, a total of 372 workmonths were expended by CDA engineers to bring the reengineered DPACS system from concept to implementation. Since specific test and evaluation, technical integration, and program management costs were not identified, it was assumed that they were included in the total software development costs. They were based on yearly levels of effort, and the assumption that the software design engineers would test and integrate the software and hardware as well as manage the installation of DPACS at each of the five sites. Based on DLA-Z documentation, CDA labor through fiscal year 1992 amounted to $2.92 million. Because these costs have not been defined by year, it was assumed costs were incurred evenly over a five year period beginning in fiscal year 1987. Adding in commercial software costs brings total software costs to date to $10.75 million.

Other. Site preparation and travel costs of $28,000 were provided for fiscal year 1991 and 1992. However, other site preparation costs were included as part of either hardware or software procurement.

Total investment costs for all DPACS hardware at all sites were estimated at $24.96 million. To date, no costs for test and evaluation, technical/integration support, program management or information processing operations have been associated with DPACS. Exhibit 5-4 provides a summary of the incurred costs that have been identified as being directly attributable to DPACS development and implementation through fiscal year 1992.

Recurring costs

Recurring costs have begun to accrue at sites in which hardware and software have been fully implemented. DLA cost data aggregate all hardware and software maintenance at a site, but do not collect costs at the individual system level or hardware tier level. As a result, it was necessary to estimate the actual costs that DPACS had borne for software and hardware maintenance since its implementation.

Software maintenance. Since DPACS software was in the development phase as of fiscal year 1992, DSAC personnel were not performing maintenance on the installed software other than to replace it with updated versions implemented at other sites. This results in no direct maintenance costs for currently installed sites as of fiscal year 1992. Maintenance will begin after final DPSC implementation in fiscal year 1993. It should be noted that other personnel at DSAC and at the centers are participating in current minor modifications and

problem identification. However, they have not been included in this analysis because of inability to quantify their magnitude.

Hardware maintenance. Due to DLA's cost collection methodology, actual hardware maintenance costs were not available. DPACS costs were estimated based on current industry standards and contract data were possible. Industry standard estimates of personal computer and NIPs maintenance costs average between 5 and 6 percent of original purchase price on an annual basis for the life of the computer. A wider discrepancy in the maintenance costs for LANs exists due the varying nature and complexities of the networks. As a result, a conservative figure of 8 percent of purchase price was assumed for annual maintenance costs in this analysis. These figures were applied to the actual costs for each hardware component procured for DPACS beginning in the procurement year. Maintenance of Gould minicomputers was estimated at $120,000 per machine based on conversations with DLA personnel. Actual maintenance contracts were not available at the time of this analysis. Using this methodology it was estimated that hardware maintenance costs attributable to DPACS hardware total $3.59 million through fiscal year 1992.

A summary of the costs attributable to DPACS implementation to date can be found in Exhibit 5-4, with details for each element of cost provided in Appendix F.

Exhibit 5-4
DPACS Costs to Date ($ 000, actual year)

	FY87	FY88	FY89	FY90	FY91	FY92	Total
Investment							
Hardware	$1,233	$3,687	$2,556	$1,668	$3,648	$1,392	$14,183
Software	584	3,552	2,237	1,717	1,505	1,149	10,745
Other - Site Preparation	0	0	0	0	28	0	28
Recurring Costs							
Software Maintenance	0	0	0	0	0	0	0
Hardware Maintenance	126	514	601	759	840	753	3,594
Total	$1,943	$7,753	$5,394	$4,144	$6,021	$3,295	$28,550

Accrued benefits

In this subsection the study team identifies and quantifies benefits realized as a result of DPACS implementation through fiscal year 1992. We focused our observation of actual performance at DISC, where DPACS has been operational for over one year. Implementation at the other centers is ongoing and complete to varying degrees, but insufficient operational time has elapsed to attempt to assess trends and quantify an impact. These benefits are a result of actual costs incurred; no benefits have been identified as a result of future development.

This section is organized into personnel benefits and lead time savings. In our discussion of personnel impact we:

- discuss actual organization impact and workload changes at DISC;
- describe, where appropriate, near-term projected impact at the other centers; and
- analyze changes to DPSSO standards that have resulted from DPACS implementation.

Our discussion of lead time changes focuses on backlog reduction and decreases in the age of transactions and volume of backlog. Actual experience documented in this section, augmented

by assessments of standards, is used in projecting future benefits across all supply centers in section 6 of our report, Future Costs and Benefits.

Personnel

Exhibit 5-5 summarizes the areas most affected by the addition of DPACS to the solicitation and award processes at DLA. A major benefit of DPACS has been the cash savings realized as a result of restructuring the support functions within the Directorate of Contracting and Production. The sections following the DISC reorganization description illustrate specific clerical, buyer, and supervisory functions that have been altered due to DPACS implementation, the resulting changes in the DPSSO standards, and the associated cash savings.

Exhibit 5-5
Key Areas Impacted by DPACS

BUYER	CLERK
Solicitation	PR into Contracting
Clause selection	Typing and copying of RFQ
Automated referrals	Contract typing
Vendor selection	Award work sheet input
ABVM vendor evaluation	Award proofing

SUPERVISOR
Funding verification
PR assignment

DPACS operation at DISC. The DISC Command Data Base for Contracting and Production was the study team's primary source of statistical information for fiscal years 1987 through 1992, including PR line items awarded, postaward work-in-process (WIP), lead time, and total personnel on board. According to the data base, the total number of personnel on board in Contracting and Production has dropped from 658 in September 1987 to 583 in September 1992. While not all of this 75-person reduction can be attributed to DPACS, it is important to note that staffs are being reduced when comparing actual personnel savings documented later in this section of our analysis. Lead time and postaward WIP statistics have been used to compile DPACS-related benefits.

DISC Reorganization. The Directorate of Contracting and Production at DISC was reorganized as a result of process improvements gained from initiating DPACS automation. Exhibit 5-6 illustrates the Directorate structure both pre- and post-reorganization.

The largest affect on staffing levels was a result of the elimination of the Operations Support Division (OSD) and the formation of the OMD. DPACS implementation directly impacted this new division eliminating most of the tasks (typing, editing, work sheet preparation, and RFQ processing) previously performed in the Document Preparation Sections of the OSD. DPACS added additional requirements for bid/proposal/quote entry; however, these functions were better performed by the procurement clerks in the commodity sections of the individual contracts divisions. Therefore, the Document Preparation Branch was eliminated and remaining functions were transferred to the individual contracts divisions. DPACS, in combination with SAMMS Procurement Electronic Data Exchange (SPEDE), also eliminated the award input functions once performed in the Source Data Automation Section. Bid list

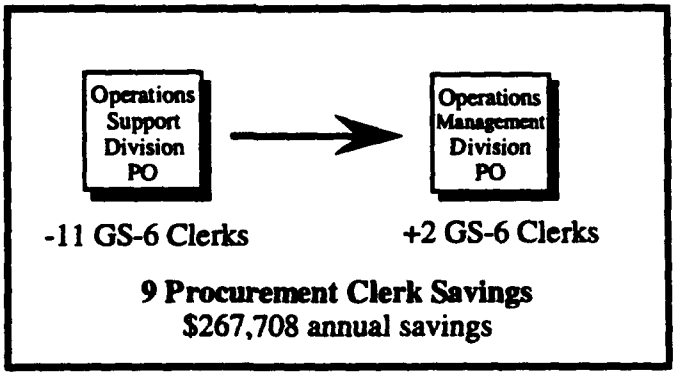
Exhibit 5-6
DISC Directorate of Contracting and Production, Prior to Reorganization

DISC Directorate of Contracting and Production, Post-reorganization

maintenance was modified and streamlined by DPACS. Other functions (bid control and abstract, document distribution, and postaward support) performed by this section, and still required with the use of DPACS, were transferred to the Document Management Branch of the new OMD.

The Files Management Branch was relocated from the Production Division to the OMD. An Office Management Branch was established within the OMD to handle administrative functions such as Freedom of Information Act administration, MIPR control, personnel actions, equipment designation and utilization, and security. Many of these duties were once performed by procurement analysts or administrative personnel in the Plans, Policy, and Systems Office. The new branch freed the analysts of these extra duties. Exhibit 5-7 illustrates the personnel savings experienced at DISC in the transition from OSD to OMD.

Exhibit 5-7
Staffing Reductions in DISC-OSD



In addition to the documented nine FTE clerical savings, two other areas were impacted as a result of DPACS – postaward modification support and supervision.

Postaward modification. Interviews with contract supervisors indicated a major improvement in postaward transaction activity. At DISC, approximately 100 staff support this effort, which consists of scope, schedule, technical changes, and a significant number of administrative changes to correct mistakes and deficiencies. DPACS has measurably reduced this type of effort.

Based on DPSSO automated work counts for the standard that describes the postaward activity, standard 1530, workload has decreased from 5,254 new transactions per month in fiscal year

1990, to 3,490 per month in fiscal year 1992, a reduction of 1,764 as a result of DPACS. The standard time for this transaction is .7239 hours per action. By multiplying the standard times the monthly decrease of 1,764, times 12 months, an estimated 15,324 hours per year are saved. Adjusted for leave (18 percent), this equates to approximately 9 FTEs. Half were assumed to be GS-7, step 5; half GS-9, step 5. The 9 FTE savings equates to $255,274 per year using fiscal year 1993 burdened salaries.

The following narrative provides a qualitative discussion of reduction of postaward work in progress (WIP) as a result of DPACS. Since DPACS was installed, the volume of postaward WIP at DISC has decreased by more than 50 percent. Exhibit 5-8, extracted from DISC-P's command data base, illustrates this change in postaward workload.

Exhibit 5-8
Postaward Work in Process

Time Period	Postaward WIP (Monthly)
Fiscal Year 1988 Average	10,685
Fiscal Year 1989 Average	11,799
Fiscal Year 1990 Average	12,471
October 1990 - January 1991	10,689
February - September 1991	8,753
Fiscal Year 1992 Average	6,223
September 1992	5,312

In an effort to determine what other effects DPACS has had on postaward functions, interviews were conducted with postaward personnel at DISC (DISC-PR). Based on these interviews, it was determined that DPACS has affected other major elements. Some elements identified by DISC are illustrated in Exhibit 5-9. While this exhibit is not all-inclusive, it illustrates the dramatic changes that have occurred in the postaward arena.

Exhibit 5-9
Average Yearly Postaward Receipts

Category	Average Yearly Receipts FY 90	FY 93 est.
Vendor Nonreceipt of Order	5,500	1,350
Vendor Cancellations	4,500	500
Quality/Technical Issue	11,000	5,150
Contract Deficiencies	5,700	250

Supervision. DPACS has reduced the requirement for supervisory time in several areas.

PR assignment. The time required to assign PRs to buyers has dropped dramatically. Supervisors are no longer required to manually analyze each individual PR to determine which buyer should receive it. DPACS can make buyer assignments by evaluating criteria established in management tables within the system. The only supervisory function involved is the maintenance of the data contained within the assignment tables.

Award approval. Because DPACS performs front-end validation, most buyer errors are eliminated. DPACS will not send an award work sheet to the supervisor until it is free of logical, mathematical, or typographical errors. As a result, supervisors do not have to spend time looking for data entry errors. The automatic clause selection feature also reduces the number of buyer errors, thus, less supervisory review is required to determine that all needed clauses have been included.

Funding verification. Funding verification is performed by the supervisors on DPACS. Before DPACS implementation, awards were sent out to the OSD for verification of funding

availability and contract number assignment. Now, DPACS assigns a contract number before sending the work sheet to the supervisor for approval. Once the supervisor approves the award, he/she checks for funding via DPACS. After DPACS has queried SAMMS in an overnight batch run, DPACS returns the funding status. Although, the DPACS process creates an additional step for the supervisor to complete, the funding process on a whole is streamlined. When the contract was sent to OSD prior to DPACS, it typically took two to three weeks for funding to be verified and award documents to be prepared and mailed. The entire process, including printing and mailing of the award package, takes only a few days with DPACS.

DPSSO standard 1320 was used to conservatively estimate supervisory savings owing to changes in these steps. Supervisor review has been eliminated from this standard by DPSSO as a result of DPACS implementation. This equates to 18.5 hours per buyer and is illustrated in Exhibit 5-10.

Exhibit 5-10
Estimated Supervisor Savings at DISC

Site	Number of Buyers	Supervisor Hours Saved	FTE Savings	Cash Savings
DISC	198.00	3,663.00	2.00	$117,276
Supervisor typical salary (GS-12, step 5)			$45,263	
Burdened salary			58,638	

In summary, 20 FTEs have been saved at DISC, based on documented changes in workload owing to DPACS improvements, elimination of a large percentage of clerical functions, and improved efficiency through systems automation. This estimate is qualified by the observation that the full capability of DPACS is not yet being utilized. An indicator supporting this assessment is provided later in our analysis in a discussion of DPSSO standards. Exhibit 5-11 provides a summary of the personnel savings at DISC.

Exhibit 5-11
DISC Personnel Savings

	FTE Reduction	Annual Cash Savings (FY 93$)
Clerical	9	$267,708
Postaward	9	255,274
Supervisory	2	117,276
TOTAL	20	$640,258

Other site impact. Based on preliminary discussions, DESC and DGSC are currently considering staffing changes and reorganizations, largely created by DPACS. DESC attributes a four-clerk reduction to date to DPACS. However, system operation experience limits further actual benefit accrual at these and other sites.

Paper forms reduction

Based on discussions with supply center personnel, approximately 400,000 forms were used each year to complete the contracting processes prior to DPACS automation. Of those 400,000, about 300,000 were used and 100,000 were thrown away because of changes in form content. Based on discussion with DESC, the cost of these printed forms approximated $0.03/page. Since DPACS eliminates the need for all these forms, and costs for printing are

included in our cost estimates, an annual savings of $12,000 (400,000 forms * 0.03 per form) accrues at DISC.

DPSSO standards

During the first full year of DPACS operation, DPSSO personnel traveled to DISC and updated the procurement standards impacted by the system. Interviews with the DPSSO staff and comparison of standards before and after system operation provided the study team with excellent tools for correlating DISC actual results and extending savings to the other centers. This is discussed in the section 6, Future Costs and Benefits. The benefits associated with the analyzed standards are grouped into the following categories:

- on-line referrals
- automated clause selection
- vendor selection
- quote evaluation/price reasonableness
- PR into contracting
- RFQ typing and copying
- award work sheet input
- type small award

The study team, in conjunction with DPSSO, analyzed these standards before and after implementation of DPACS. Exhibit 5-12 summarizes the results. Categories are grouped by staff level (buyer or clerical), and show hour requirements per transaction, amount of reduction in FTEs, and savings dollars for DISC. After totaling the standard reductions for clerks and buyers the total FTEs saved were rounded down to indicate a conservative estimate of the number of clerk and buyer positions reduced. Comparison of projected FTE savings from analysis of standards is 47 FTEs, as opposed to observation at DISC of 20 FTE savings to date.

Exhibit 5-12
DISC Savings - Standards

Standard	DISC Function	Pre DPACS Standard	Post DPACS Standard	Reduction	Minutes	Workload	Hours Saved Based on Workload	FTE Equivalent Saved	Whole FTE	GS-Level	Cash Savings Whole FTE
Buyer											
1310	Referral/clause selection	0.1926	0.0772	0.1154	6.92	99,470	11,479	6.75		9	
1310	Vendor selection	0.0745	0.0406	0.0339	2.03	99,470	3,372	1.98		9	
1320	Quote/price reasonableness	0.2963	0.1429	0.1534	9.20	114,773	17,606	10.35		9	
	subtotal						$32,457	19.08	19.00		$768,274
Clerk											
1101	PR to Contracting	0.0949	0.0082	0.0867	5.20	99,470	8,624	5.07		5	
1111	RFQ Typing & Copying	0.4508	0.0925	0.3583	21.50	99,470	35,640	20.95		5	
1161	Award worksheet input	0.0138	0.0000	0.0138	0.83	114,773	1,584	0.93		5	
1131	Type Small Award	0.0299	0.0039	0.026	1.56	114,773	2,984	1.75		5	
	subtotal						$48,832	28.71	28.00		$747,226
					Total		$81,289	47.79	47.00		$1,515,500

On-line referrals. On-line referrals allow the buyer to request additional data or clarification through DPACS. PRs can be referred to supply, cost and price, quality and technical, or any other department that has access to DPACS. This function, in conjunction with other on-line data such as previous buy data, other open PRs, and contractor performance history, provides the buyer with ready access to all data needed to complete the solicitation process in a more efficient manner without having to obtain hard copy files or interrogate SAMMS from a remote terminal.

Automated clause selection. Prior to the implementation of DPACS, solicitations and contracts required extensive writing and rewriting for proper incorporation of all relevant contract clauses. This was a time-consuming process for buyers and support clerks, and also led to nonstandard and/or incomplete solicitations requiring modification after release. In addition to adding processing time, bidders were unsure of changing contractual requirements from solicitation to solicitation.

Based on the responses provided to a series of questions by the buyer, DPACS automatically selects required clauses. The automatic inclusion of certain clauses eliminates the need for buyers to manually research and select most clauses. The DPACS "Help" function is available to assist the buyer with the selection of any additional clauses necessary.

As a result of DPACS implementation, the DPPSO standard for small solicitations, standard 1310, has been reduced. In an *SPD Deviation Request Summary* report dated 17 November, 1992, variations in the manual and automated standards were analyzed. Both on-line referrals and automated clause selection are addressed in the same element of standard 1310:

> "The review/evaluation of small purchase requests covered in elements A and B current and element B proposed decreased from .1926 to .0772 , a difference of .1154 hours or 6.9 minutes. This decrease is due primarily to the following factors: the buyer has on-line access to previous buys eliminating the need to obtain contract files; referral for additional data or clarification is on-line, eliminating need for completing forms; buyer has on-line access to data such as clauses, open PRs, and contractor performance history that previously required obtaining hard copies or interrogation of a remote terminal."

There are two benefits associated with the improved clause selection process: (1) as discussed above, the clause selection process under DPACS leads to more complete and consistent solicitations and contracts when compared to the manual process, and (2) the reduction of postaward modifications.

Vendor selection. The data required to choose the vendors that receive solicitations is available on DPACS. For instance, all vendors that have previously been awarded contracts or expressed an interest in a particular NSN are listed along with their names and addresses in the mailing list option; the DPACS data base contains information on the size of each vendor. Small business set-aside decisions can be made easily with the information provided.

The reduction in standard 1310, the standard for small solicitations, also covered a reduction in the time needed to select vendors. The DPPSO report states:

> "The selection of vendors covered in element F current standard and element D proposed standard decreased from .0745 to .0406 hours. A frequency decrease at the element level from 3.4 to 1.0 occurrences combined with the reduced base time decreased to standard time .2127 hours or 12.8 minutes. The decrease is due to on-line access to vendor information and approved source listing."

Quote evaluation/price reasonableness. The pricing assistant feature of DPACS enables the buyer to quickly check whether a price quote fits into the predicted range of prices for an NSN. Past price history along with adjustments for the time elapsed since the last purchase are taken into consideration. This eliminates the need for the buyer to perform manual calculations and analysis when evaluating bids.

The DPPSO *SPD Deviation Request Summary* (November 17, 1992) for standard 1320, DPACS Evaluation and Award (small), highlighted price reasonableness determination as a key area of savings. The standard decreased by .1534 hours, or 9.2 minutes, per bid. There

was also a frequency decrease, owing to a more streamlined approach used by the buyers along with DPACS capability to perform calculations and provide on-line access to needed data.

PR into Contracting. Prior to DPACS implementation, clerks performed all tasks involved in moving the PR to contracting. Various tasks were accomplished before the buyer could begin his/her work on the PR. Clerks obtained hard copy PRs, sorted them by buyer, created a folder to contain all PR information, and affixed a label to denote the priority of the PR. Clerks were also responsible for obtaining SASPS II solicitation lists and RFQs, collating the documents, and preparing the solicitation packages for mailing to the vendors. Additional tasks for the clerks when moving PRs into and out of contracting included activities related to the suspension of PRs. This, too, was an entirely manual process; clerks received the PR for suspension, forwarded the suspensions through data input to "stop the clock" on contracting's lead time, sent the PR to the appropriate directorate, maintained a system for tracking suspended PRs, received responses, and reinstated the PRs. Clerks also performed status requests, which involved receiving the request, researching by accessing a remote terminal, and forwarding the response.

Manual workload assignments were made at this stage in the solicitation/award process prior to DPACS implementation. Although the clerks were not involved in making the assignment decisions, they played a large role in the related sorting and distribution processes. The assignment process began with a PR from SAMMS. The PRs were sent to a document distribution clerk who sorted them by division/section. They were next sent to a supervisor for assignment; then another clerk distributed the PRs to the individual buyers. In addition, YPW cards were filled out and entered into SAMMS via remote terminal in order to have the PR assignment data in SAMMS.

DPACS eliminates the need for most of the clerical functions described above. The various DPACS screens contain all the data contained on the hard copy version of the PR. As a result there is no need for clerks to construct, sort, or distribute folders. DPACS is able to make a "smart" decision as to where to assign PRs for processing. When a PR is received, DPACS checks to see if there are any other open PRs for the same item; if there are, the PR is sent to the buyer with the open PR, unless other built-in workload restrictions prohibit the assignment. Clerks no longer have to sort and distribute piles of PRs to supervisors for assignment and to buyers for processing. (Note: Since some centers are still receiving hard copy PRs, the sorting and distribution functions are still required; however, the formal creation of the PR folder by a clerk is not performed.)

Suspensions are performed electronically by DPACS at most centers. At these centers, other directorates that receive suspended PRs, supply, quality and technical, cost and price, have access to DPACS. DPACS performs all necessary tracking functions related to PR suspensions. Since DPACS contains data on whether a PR is in the solicitation, evaluation, or award phase (in addition to other data) status requests can be performed through the system by the buyer or any ancillary user of DPACS.

Standard procedure times have been developed by DPSSO for the preaward process. The DPSSO standard for the administrative process of getting the PR into Contracting is standard 1101. The elements in this standard involve the initial receipt, control, folderization, and delivery of the PR to the buyer. Tasks related to the manual tracking of suspended PRs, amendments, and status requests are also included. The times associated with the 1101 standard were last updated in January 1991. Based on interviews with DPSSO, the standard will probably not be updated again because, as a result of DPACS implementation, most of its elements are no longer required.

We performed an evaluation of standard 1101 in conjunction with DPSSO personnel in order to estimate which elements would be eliminated as a result of DPACS if the standard was to be compiled with current data. Exhibit 5-13 illustrates the elements in the standard and the associated time to complete the tasks, with and without DPACS automation. The normal time for standard 1101 for the manual processes was .0852 hours. DPSSO then added a performance, fatigue, and delay factor of 11.4 percent to arrive at a standard time of .0949 hours per PR. Based on our analysis of required administrative functions when using DPACS, a revised standard would approximate .0082 hours per PR, including a performance, fatigue, and delay factor of 11.4 percent. The reduction in the standard would be .0867 hours, or 5.2 minutes, per PR. Many of the elements in the old standard 1101 are still performed; however, they are performed in an automated fashion on DPACS by the buyer. The clerical savings is significant because the clerical staff is now available to assist with other activities. The time required for buyers to perform any additional workload is incorporated into the appropriate revised standards for the buyers.

Exhibit 5-13
PR to Contracting, Standard 1101

	Standard Element	DLA Base 1985 (Hours)	DPACS 1992 (Hours)
A.	Receive/Sort Computer Products/MIPR	0.0061	0.0061
B.	Obtain/Examine MIPR	0.0013	0.0013
C.	Obtain/Examine PR/SPUR PR	0.0153	0.0000
D.	Obtain/Examine SASPS II PR	0.0074	0.0000
E.	Folderize PR	0.0120	0.0000
F.	Perform Distribution Process	0.0183	0.0000
G.	Perform Suspension Action	0.0070	0.0000
H.	Process Amendment/Cancellation/Status Request	0.0178	0.0000
	Total Normal Time	0.0852	0.0074
	Performance, Fatigue, and Delay	0.0097	0.0008
	Total Standard Time	0.0949	0.0082

In addition to personnel time savings, the elimination of this step has impacted lead time While getting the PR from SAMMS to an assigned buyer saves some time (five minutes per PR) according to the reduction in the DPSSO standard, there is a far greater impact on lead time. The standard times are only for the actual time it takes to process one PR. However, because there are delays in each step of the process (PRs sit in in-baskets, delivery is only once a day, etc.) the actual time it takes for a PR to go from SAMMS to the buyer varied from a few hours to many days. Based on discussions with various supply center personnel, it was estimated that DPACS is saving three days of lead time in this process, because with DPACS, once the PR leaves SAMMS, it is available for processing in the buyer's computer the next morning.

RFQ typing and copying. Since the buyer can complete and print the RFQ on DPACS, the clerk no longer has to type the data onto the RFQ form. The mailing list function on DPACS contains all vendor names and addresses; therefore, when RFQ documents are printed, the clerk only has to collect the pages, separate them by vendor name, and place them in a window envelope. Prior to DPACS, the clerk had to photocopy the RFQ, write the vendors name and address on each RFQ, create a mailing label, and stuff the envelopes for mailing.

Standard 1111 is the DPSSO standard for the typing and copying functions that procurement clerks perform when processing a solicitation. Because the vast majority of the elements of

this standard have also been eliminated by DPACS, this standard has not been updated by DPSSO. In order to better quantify the value of the reduced personnel requirement in light of DPACS, an evaluation of DPSSO standard 1111 was performed. In association with DPSSO personnel, we analyzed each element and subelement, of DPSSO standard 1111 in order to estimate which elements would be eliminated because of DPACS implementation. Exhibit 5-14 illustrates the standard as it existed in November 1985, and compares that to our review of the functions that are still required. As of 1985, the DLA standard time for standard 1111 was .4508 hours for each solicitation processed. Based on our analysis of required administrative solicitation functions when using DPACS, a revised standard would approximate .0925 hours per solicitation, for a reduction of approximately 21.5 minutes per solicitation, including a performance, fatigue, and delay factor of 11.4 percent.

The elimination of manual typing/writing and copying of RFQs impacts lead time as well as personnel time. Again, the impact on lead time is more than just the 20 minute reduction in time per PR as stated in the DPSSO standard. Because many PRs are completed each day, and typing/writing and photocopying was not performed the moment the item was received; RFQs would not be typed for up to two weeks according to some management estimates. Based on discussions with personnel at various supply centers, it was estimated that three days of lead time have been saved as a result on the elimination of this duplicate task.

Exhibit 5-14
Process Solicitation Administrative -Standard 1111

	Standard Element	DLA Base 1985 (Hours)	DPACS 1992
A.	Update Mailing/Source List	0.0391	0.0000
B.	Furnish Mailing/Source List	0.0049	0.0000
C.	Process Pre-Unvitation Notice	0.0165	0.0000
D.	Maintain Solicitation Register	0.0261	0.0000
E.	Prepare Solicitation Package	0.0937	0.0000
F.	Administratively Process Solicitation (large)	0.0400	0.0000
G.	Administratively Process Solicitation (small)	0.0313	0.0000
H.	Forward/Hand-Carry Large Solicitation to Printing and Reproduction	0.0076	0.0000
I.	Mail/Distribute Solicitation	0.0761	0.0761
J.	Prepare Synopsis Letter	0.0063	0.0000
K.	Maintain Solicitation File	0.0112	0.0000
L.	Fulfill Request for Solicitation	0.0407	0.0000
M.	Administratively Process Amendment Document	0.0022	0.0000
N.	Forward/Hand-Carry Amendment to Printing and Reproduction	0.0021	0.0000
O.	Mail/Distribute Solicitation Amendment	0.0040	0.0040
P.	Administratively Process cancellation Document	0.0007	0.0007
Q.	Forward/Hand-Carry Cancellation to Printing and Reproduction	0.0007	0.0007
R.	Mail/Distribute Solicitation Cancellation	0.0011	0.0011
S.	Maintain Lists/Publications	0.0004	0.0004
	Total Normal Time	0.4047	0.0830
	Performance, Fatigue, and Delay	0.0461	0.0095
	Total Standard Time	0.4508	0.0925

Award work sheet input. With or without the DPACS system, the SAMMS system must receive certain data when an award is made. Prior to DPACS implementation, the process of getting the appropriate data to SAMMS was cumbersome and required significant effort. When the buyer decided to make an award, he/she manually transcribed data from

his/her files onto a work sheet, such as the DISC Form 1223 or the DGSC Form 476. Although data elements varied from site to site, typical elements included the award date, acceptance date, plant location, shipping location, remit to address, contract type, and source type. Once the buyer completed the award work sheet, the work sheet was passed through internal mail to a procurement clerk, usually part of the OSD. The procurement clerk would then input the data from the award work sheet to a IV Phase terminal for uploading to SAMMS. This process could take anywhere from one day to one week.

DPACS has streamlined this process. As the buyer completes the proposed award, most of the data previously transcribed onto the award input form are entered into DPACS. This results in minimal additional data input at award time. When the buyer completes the award process in DPACS, an electronic version of the award work sheet is uploaded to SAMMS during the next batch cycle (nightly). The streamlined process results in an estimated lead time savings of three days.

The DPSSO standard for this process is number 1161, computer input/inquiry. The base time for this standard in January 1991 was .0138. Because all data entry is now done in DPACS by the buyer, the clerical functions included in this standard are no longer required and a reduction of .0138 clerical hours, or .8 minutes, per PR accrues.

Type small award. To prepare the contract document, prior to DPACS, the buyer would handwrite the contract award information and send the package to a clerk in the OSD to type the document and photocopy it for filing purposes. This duplication of effort is eliminated with DPACS. DPACS completes the contract document automatically based on data that the buyer has entered into DPACS. The document is produced on a laser printer and is available immediately. Extra copies for the files can also be printed or copied at this time, although, most copies are still made through the OMD.

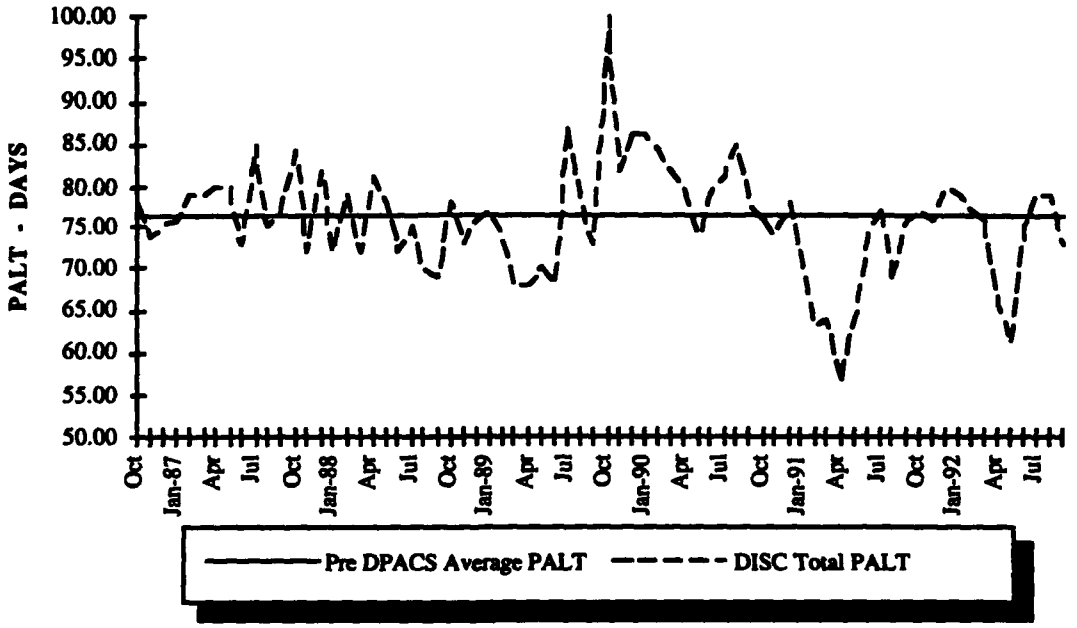
DPSSO standard 1131, Administrative Process for Award, contains a subelement for typing small award documents. The standard time for contract typing prior to DPACS was .0299 hours. Compared to the standard time for a branch operating with DPACS (.0039 hours), a savings of approximately 2 FTEs is realized at DISC.

System rejections based on manual data input. One of the benefits of DPACS is the reduction of duplicated data entry. Wherever data are entered more than once, the chance of an error increases. Because DPACS reduces the volume of data entry, data entry errors should be reduced, thereby increasing the overall quality of the award. The DPSSO standard 1171 contains the standard time it takes to process a system rejection. As of January 1991, the standard was 6.5 minutes (or .1082) for each error. Based on automated work counts provided by DPSSO, the volume of errors at DISC has dropped from 488 per month in 1990 to 417 month in 1992. DPSSO was not able to provide work counts prior to 1990, and since, DPACS was in place prior to 1990, the 1990 data already show some effects of reduced errors. The reduction of 71 system rejections saves 7.68 hours a month at DISC. Since the savings is not significant, it was not quantified with the overall DISC savings; however, it was included to demonstrate the improved quality in Contracting as a result of fewer rejections.

Lead time

The earlier economic studies described in the previous section of our report forecast a reduction in ALT ranging from 12 to 21 days and associated savings in inventory costs. Citing the DISC example and the DISC Command Data Base as a reasonable source, little change in PALT has occurred from before DPACS, in fiscal years 1987 and 1988, when ALT averaged 76.5 days, to after DPACS, in fiscal year 1992, when ALT averaged 74.8 days. Exhibit 5-15 below is a five-year track of DISC PALT.

Exhibit 5-15
DISC PALT



ALT is influenced by a number of uncontrollable external variables as well as the controllable steps completed from requirements definition to contract award. Among the uncontrollable variables are budget cuts or freezes, changes in demand (e.g., war or responsibility transfers), fluctuations in number of customers and customer requirements, and changes in acquisition policy (competition in contracting) or acquisition tools (delivery order contracts). Attempting to neutralize these global issues and quantify the actual impact of DPACS implementation from a top down perspective was not possible.

In investigating DPACS impact from a bottoms up perspective, the study team focused on the DPACS impact on reducing procurement workload backlog. By way of introduction to the process, the following points are made:

- the PALT of a transaction is not recorded in the command data base until it is completed (awarded). This means that WIP, regardless of amount or age, does not effect PALT statistics until it is completed.

- a significant amount of backlog has been worked off as a result of DPACS.

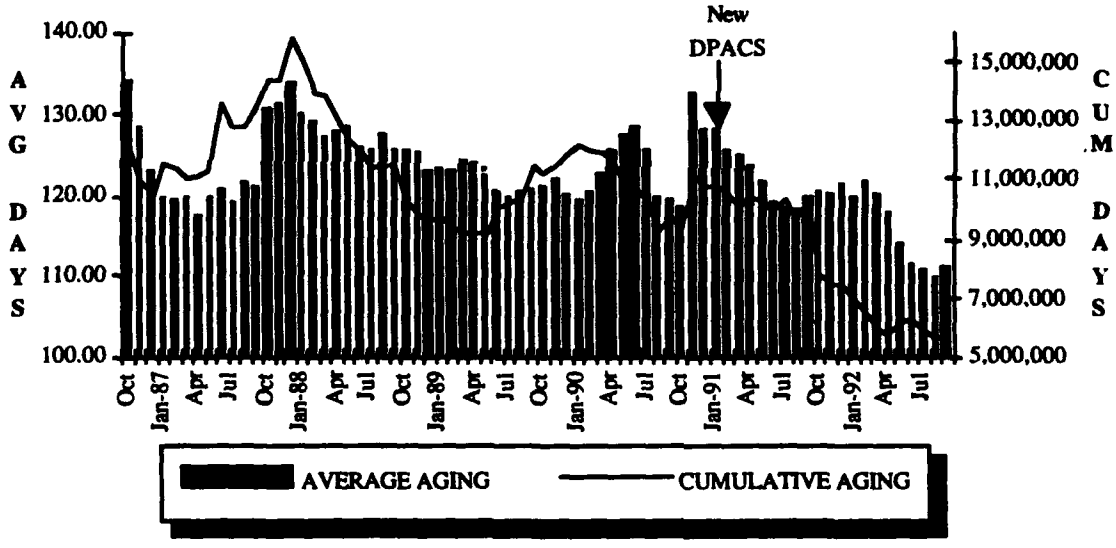
- the average age of all PR line items (PRLI) has decreased from approximately 125 days to 116.5 days and continues to decrease. When backlog is worked off, PALT tends to increase since older PRLIs enter the data base.

Trends in the aging of PRLIs at DISC over time indicate that substantial PRLI aging reductions have been made as a result of DPACS implementation. Data regarding the age of each PRLI awaiting processing are collected at each ICP, where they are grouped into categories of ages, such as (over 66 days, and over 226 days). In order to analyze the historical trends in PRLI aging, it was assumed that all PRLIs in an aging bracket had been in the process for the least

number of days for the category. This leads to a very conservative estimate of aging. For example, all PRs listed as being over 131 days old were assumed to be 131 days old, and all PRLIs categorized as older than 365 days were assumed to have been backlogged for 365 days. Using these assumptions, conservative estimates of total and average PRLI backlog could be determined for analysis over the period prior to and after the implementation of DPACS.

Using this data, the cumulative backlog of all PRLIs in 1987 (pre-DPACS) was 11,000,000 days. This equated to an average age of 125.3 days per PRLI. In 1992, using the same approach, the cumulative backlog of all PRLIs was 5,500,000, or 116.8 days per PRLI. These results have spilled over into all categories of management data. Total PRLIs on hand have dropped from averages of 75,000 to 80,000 to averages of 55,000 to 60,000, a more than 25 percent reduction. Exhibit 5-16 graphically depicts these trends in average and cumulative PRLI aging at DISC in relation to DPACS implementation. Total PRs on hand have been reduced by a similar percentage, while the number of PRLIs in suspense has fallen from pre-DPACs averages of 7,000 per month to roughly 3,000 a month.

Exhibit 5-16
DISC PRLI Aging

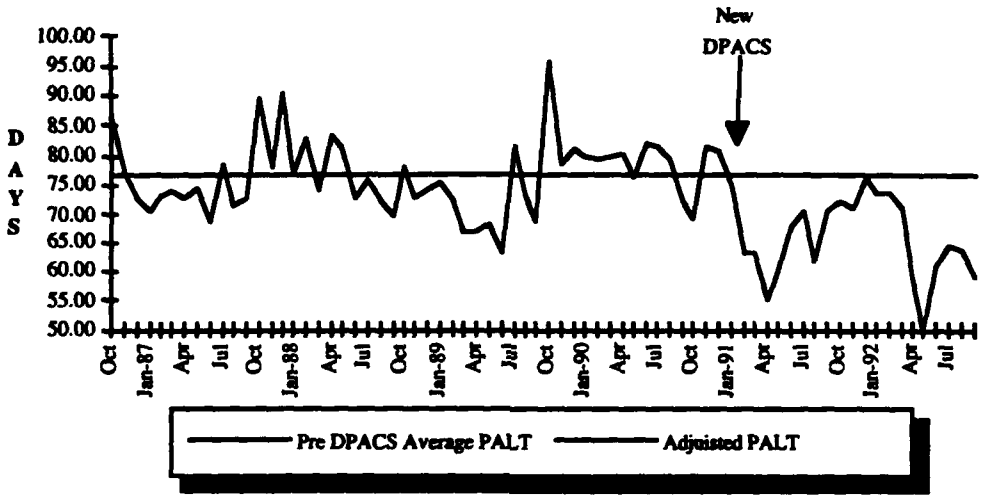


As mentioned above, prior to original DPACS implementation, at DISC, PALT averaged 76.5 days and the average age of PRLI backlog was 125.3 days. Using these numbers as a base, a comparison can be drawn with fiscal year 1992, the first full year for which reengineered DPACS was in operation, to quantify the benefits accrued to date. During fiscal year 1992 average total PALT was reduced by 1.7 days, to 74.8 days, from the pre-DPACS average.

However, average PRLI backlog age dropped to 116.5 days. Adjusting the fiscal year 1992 PALT of 74.8 by the 8.8 day reduction of PRLI backlog that increases PALT averages, yields an adj ed PALT of 66.0. This adjusted PALT represents the reduction that would have been evidenced by DPACS implementation had the completed backlog not been worked off and added to PALT during fiscal year 1992. Using this calculation results in a PALT reduction attributable to DPACS of approximately 10.5 days (8.8 + 1.7). The trend in PALT, adjusted to minimize the PALT increases attributable to the burning off of PRLI backlog, can be seen in Exhibit 5-17. This savings compares favorably with the management estimates of 9 days of

lead time reduction mentioned in the functional analysis in previous sections as a result of reduced manpower requirements to perform preaward functions with DPACS.

Exhibit 5-17
Adjusted PALT



Using the most recent DORO figure of $1,143,714 savings per day of lead time saved, and time phased for 20 percent in year 1, 15 percent in year 2, and 6 percent in year 3, results in the following savings in year 1 of $2,410 799, in year 2 of $1,801,350, and in year 3 of $720,540. These one time, and also the recurring lead time savings, are assumed to begin accruing in fiscal year 1993 and are shown in Section 7, Future Costs and Benefits.

Summary

Exhibit 5-18 below summarizes these costs and benefits accrued through fiscal year 1992. Costs are presented in then year dollars and are converted to fiscal year 1993 dollars to enable comparison to benefits which are also in fiscal year 1993 dollars.

Exhibit 5-18
DPACS Costs and Benefits Through Fiscal Year 1992 (FY 93 million $)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	TOTAL
Costs							
Investment	$1.82	$7.24	$4.79	$3.38	$5.18	$2.54	$24.96
Recurring costs	$0.13	$0.51	$0.60	$0.76	$0.84	$0.75	$3.59
Total Costs	$1.94	$7.75	$5.39	$4.14	$6.02	$3.29	$28.55
Costs (FY 93 $$)	$2.40	$9.25	$6.19	$4.62	$6.39	$3.42	$32.27
Savings (FY 93 $$)							
FTEs							
Personnel Savings						$0.76	$0.76
Paper reduction						$0.01	$0.01
Lead time (One-time;10.5 days)						$0.00	$0.00
Lead Time (Recurring)						$0.00	$0.00
Total Savings	$0.00	$0.00	$0.00	$0.00	$0.00	$0.76	$0.76

ECONOMIC ANALYSIS
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DLA PRE-AWARD CONTRACTING SYSTEM

CONTENTS

FUTURE COSTS AND BENEFITS

Future functionality

For projecting costs and benefits resulting from DPACS implementation through fiscal year 2001, it is assumed the existing DPACS will be deployed at the remaining sites and the folder sizing issue will be resolved through the personal tier conversion project. Since the inception of this analysis, the CIM Procurement Council has selected DPACS as a DoD standard migration system It is expected that the council will identify and fund new functionality to expand the current baseline DPACS. Weapon system capability is an example of possible new functionality. Any additional functionality will be analyzed through separate economic analyses on a case by case basis. Appendix G describes the functionality a DoD system may provide, the portion of that functionality provided by the existing DPACS, and potential benefit areas DoD should obtain as a result of implementing a standard system.

Future costs

The following paragraphs discuss the DPACS implementation costs for the remaining two sites, personal tier conversion project, and hardware replacement and maintenance for the period of DPACS operations through fiscal year 2001.

Investment

Additional investment will continue by DLA in fiscal years 1993 and 1994, primarily for personal tier conversion, while replacement hardware and software investment will continue as long as the system remains in operation. This investment should allow all DLA sites to process all PRs, without regard to the size of the PR. Within DLA, this effort is known as the personal tier conversion. DLA is in the process of determining the possible alternatives that would resolve the issue of electronic folder sizes (see Analysis Methodology). At this point in time, DLA has not decided which alternative will provide the best technical solution at the least cost.

DLA-Z has projected estimated costs for the personal tier conversion based on expert knowledge and discussions with the contractor performing the sizing study. DLA's current estimate is that 11 CDA workyears will be required in fiscal year 1993 and 12 CDA workyears in fiscal year 1994. This translates to $576,279 in 1993 and $628,668 in 1994 (in fiscal year 1993 dollars). An additional $620,500 and $949,400 is estimated by DLA for contractor support for fiscal year 1993 and 1994 respectively. In addition, miscellaneous hardware and software costs have been budgeted for fiscal year 1993 and 1994. These amounts, $124,500 and $266,000 respectively, are for various PC commercial off the shelf software and LAN communication equipment.

DLA personnel confirmed that all hardware investments for initial implementation had been made prior to fiscal year 1993. As a result, only hardware replacement will be necessary. Using DLA's current policy of replacing workstations and printers on five year intervals and DMINS on eight year cycles, total estimated costs for hardware replacement from fiscal year 1993 through the period of this analysis, fiscal year 2001, were estimated to be $11.35 million (this number is supported later in this section).

As discussed in the Analysis and Methodology section of this report, it has been assumed that HP 9000/877 minicomputers, running Oracle's V7 RDBMS, will replace the existing Gould minicomputers. Cost estimates were developed for the mid tier replacement using current contract prices, and were based on the configuration presented in Exhibit 6-1. A ten percent additional cost was added to identified costs to account for cabling and other site unique miscellaneous items. As noted in the Analysis and Methodology section of this report, these configurations represent replacements, not enhancements.

Exhibit 6-1
Midtier Replacement Configuration

Hewlett Packard 9000/877 Business Server	$168,345
Hewlett Packard PA-RISC 64 MHz Processor	
Numeric Co-Processor	
8.0 Gigabyte DAT	
IEEE 802.3 LAN Interface	
384 Megabyte Random Access Memory	
6.71 Gigabyte Hard Disk	
10 - 690 meter DDS cassettes for DAT drive	
2 Cabinets/Racks	
Surge Supressor	
SCSI Terminal Server	
Four - HP 9000 Model 730 Servers	
Hewlett Packard PA-RISC 66 MHz Processor	
Integral 66 MHz Floating Point Co-Processor	
128 Megabytes Random Access Memory	
840 Megabyte SCSI II Hard Disk	
3 - 5 KVA Uninterrupted Power Supply with cables	22,820
20.325 Gigabyte Chassis Mounted Hard Disk	41,786
10.84 Gigabyte Rack Mounted Hard Disk	22,286
Additional 7 Address SCSI controller	3,411
Expansion Cabinet	926
Acoustical Suppression for Cabinet	188
Subtotal	259,762
Plus Misc. Cables, Site Specific Requirements	26,000
Total Cost	$ 285,762

As a result of the assumption that the Gould minicomputers will be replaced with HP 9000/877 minicomputers, running Oracle's V7 RDBMS, a cost estimate is necessary for porting the DPACS database from Unify to Oracle. In general, the effort required to port DPACS from Unify to Oracle will depend on several criteria. First, the size of the files and the number of screens and reports must be considered. Next, the level of documentation, for the database and "C" programs must be evaluated.

At the present time, no detailed analysis has been performed to determine the full requirements for porting DPACS from Unify to Oracle. However DSAC did provide an estimate of 42 workmonths, assuming a worst case scenario. To determine the cost we used the fiscal year 1993 cost of one DSAC FTE of $52,389 and added a leave factor (18%) and benefit factor (29.55%), this translates to $280,303 (fiscal year 1993 dollars). It is assumed that this conversion will occur in fiscal year 1995 with the first new minicomputer purchase.

As a result of the assumption that Oracle will be used in conjunction with the new HP 9000/877 minicomputers, training will be required for the CDA staff. Currently, DPACS personnel at the CDA have little knowledge of Oracle's V7 RDBMS. This staff approximates 5 to 6 people. Therefore, it has been assumed that six months of training will be provided to six CDA personnel. Using the fiscal year cost of a CDA FTE of $52,389 and adding a leave factor of 18% and a benefit factor of 29.55%, a one time charge of $240,260 was allocated in fiscal year 1995 (fiscal year 1993 dollars).

Workstation and printer replacement costs were estimated using current costs from the U.S. Army Small Multiuser Computer contract. The workstation configuration in Exhibit 6-2 was used as the standard replacement for DPACS workstations. Replacement of the desktop NIPs was estimated using the desktop laser printer identified in the U.S. Army Small Multiuser Contract, while network NIPs costs were estimated using GSA schedule rates from various vendors since no current DLA contract vehicle could be identified. A true 20 page per minute printer was assumed for network use with the one identified below as a reasonable proxy for the price. Exhibit 6-2 also identifies NIPs configurations.

Exhibit 6-2
Replacement Workstation Configuration

Intel 80486DX 33 MHz Processor	
8 Megabyte Random Access Memory	
213 Megabyte Hard Disk	
5.25" 1.2 Megabyte Floppy Disk Drive	
3.5" 1.44 Megabyte Floppy Disk Drive	
Super VGA Monitor	
Graphics Accelerator Super VGA Card	
MS DOS 5.0	
Subtotal	$2,221
Windows 3.1 with Mouse	$81
Total Cost	$2,302

Replacement NIPS Configuration

Desktop NIP	
Texas Instruments 9 page per minute laser	
with 5 toner cartridges	
Total Cost	$1,289
Local Area Network NIP	
QMS PS-2000 Departmental Printer	
20 pages per minute	
with Ethernet network card	
Total Cost	$12,636

DLA estimates that DSAC and contractor software development will only be required for implementing DPACS at the final two sites. They will also resolve any technical anomalies or user performance enhancement requests that may be required after operations at all sites have been underway for some time. This effort has been included in the software maintenance line under recurring costs.

Recurring costs

As DPACS continues in operation, the major costs to the system aside from hardware replacement will be hardware and software maintenance costs.

Software maintenance. Costs were estimated using information in DLA's mini functional economic analysis performed for the CIM procurement council. Levels of effort were established, beginning in fiscal year 1994 with 3 FTEs at DSAC to work on the 463 problems trouble reports outstanding. This level of effort is estimated to taper to 1 FTE from fiscal year 1995 through the end of the analysis. Eighty-six of the problem reports should be resolved with the final implementation of DPACS at DPSC Medical. A majority of the remaining identified problems will be addressed with the estimated standard maintenance effort in fiscal year 1994, and later, if necessary. The switch to new minicomputers and a SQL compliant DPACS will require annual software maintenance for Oracle RDBMS. Based on current contracts, this cost will be $1,222 per copy per year after a one-year warranty period. Additionally, an estimate of $35,000 for travel (fiscal year 1993 dollars) has been included in each year for maintenance related travel.

Hardware maintenance. The methodology used to determine actual maintenance costs was carried forward to future time periods. Some modifications were made, however, to account for changing realities in DLA hardware procurements. Maintenance for the HP 9000/877 minicomputer was established using existing contract data. To maintain the configuration identified in Exhibit 6-1 annual maintenance costs on current contracts will be $9,228 after the first year warranty expires. The current maintenance expense on the Gould minicomputers is more than eleven times higher than this because the models DLA operates today are no longer in production and are near the end of their useful life.

Under the Army Small Multiuser Computer and Desktop III contracts, workstations and NIPS have a two year warranty that eliminates all maintenance costs. This warranty was factored into the analysis. Using these assumptions, future hardware and software maintenance costs through the end of the period of this analysis are estimated to be $5.29 million, bringing the total remaining investment, operations and maintenance costs for DPACS to $21.1 million. A summary of these costs can be found in Exhibit 6-3, below, with details provided in Appendix F.

Exhibit 6-3
Total Remaining Costs FY 93-FY 01 (FY 93 $000)

	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	Total
Investment										
Hardware	$337	455	1,005	3,516	1,477	564	329	719	2,945	$11,346
Software	1,432	1,904	325	226	113	113	0	0	0	4,113
Other - Travel	35	67	240	0	0	0	0	0	0	342
Recurring Costs										
Software Maintenance	0	239	103	104	107	108	117	109	109	995
Hardware Maintenance	839	926	797	385	239	269	348	331	165	4,299
Total	$2,643	$3,590	$2,470	$4,232	$1,936	$1,054	$793	$1,158	$3,219	$21,096

Future benefits

Future personnel benefits are estimated by extending the benefits derived from the standards analysis described in the previous section to all the remaining centers. Using this analysis, a standard annual personnel reduction was determined and applied to all years after fiscal year 1993. Whole FTE reductions were totaled for both clerks and buyers functions from all sites, and multiplied by the respective salary to estimate total personnel savings. Exhibit 6-4 below shows a summary of the savings of 286 FTEs annually and the associated cost savings. All benefits contained in this analysis correlate to documented actual or estimated costs as previously described.

Exhibit 6-4
DLA Personnel Savings

Standard	Function	DISC FTE Saved	DGSC FTE Saved	DESC FTE Saved	DCSC FTE Saved	DPSC-C&T FTE Saved	DPSC-Med FTE Saved	Total FTE	GS-Level	Cash Savings Whole FTE
Buyer										
1310	Referral/clause selection								9	
1310	Vendor selection								9	
1320	Quote/price reasonableness								9	
	subtotal	19.00	25.00	17.00	33.00	2.00	17.00	113.00		$4,569,208
Clerk										
1101	PR to Contracting								5	
1111	RFQ Typing & Copying								5	
1161	Award worksheet input								5	
1131	Type Small Award								5	
	subtotal	28.00	38.00	27.00	50.00	4.00	26.00	173.00		$4,616,791
	Total							286.00		$9,185,999

As discussed earlier, a steady state reduction in printed paper is another, minor benefit of DPACS. This value of this savings is estimated to be $60,000 annually across all sites based on an analysis of elimination of the number of printed forms used at each site in a given year which was described in Section 5 of this report.

Quantifying the 10.5 days of lead time savings identified in the previous section leads to several types of savings over the period of the future analysis. As mentioned in the previous section, applying the following assumptions yields one-time and recurring savings:

- $1,143,714 per day (from DORO 1993 update)
- assume 41% will actually be saved to account for items which ultimately will not be replenished
- time phase savings - 20% in year 1, 15% in year 2, 6% in year 3

In year 1, fiscal year 1993 one time lead time savings of $2,465,810 are expected, with $1,868,038 of the remainder of one-time leadtime savings in fiscal year 1994 and $747,215 in fiscal year 1995, for total non-recurring savings of $5.08 million.

Recurring inventory holding costs, estimated using 8 percent of the initial non-recurring reductions, yields a savings of $406,485 per year beginning in fiscal year 1995 after all one time reductions in safety levels have been made. Smaller recurring values are expected in fiscal years 1993 and 1994 as the phase out of stock safety levels begins. Exhibit 6-5, below, presents a time phased summary of future costs and benefits.

Exhibit 6-5
Future DPACS Costs and Benefits (FY 93 million $)

	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	TOTAL
Costs										
Investment	$1.80	$2.43	$1.57	$3.74	$1.59	$0.68	$0.33	$0.72	$2.94	$15.80
Recurring costs	$0.84	$1.16	$0.90	$0.49	$0.35	$0.38	$0.46	$0.44	$0.27	$5.29
Total Costs	$2.64	$3.59	$2.47	$4.23	$1.94	$1.05	$0.79	$1.16	$3.22	$21.10
Savings (FY 93 $$)										
FTEs	286	286	286	286	286	286	286	286	286	
Personnel Savings	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$82.67
Paper reduction	$0.05	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.53
Lead time (One-time;10.5 days)	$2.47	$1.87	$0.75	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5.08
Lead Time (Recurring)	$0.20	$0.35	$0.41	$0.41	$0.41	$0.41	$0.41	$0.41	$0.41	$3.39
Total Savings	$11.90	$11.46	$10.40	$9.65	$9.65	$9.65	$9.65	$9.65	$9.65	$91.67

ECONOMIC ANALYSIS
OF THE
DLA PRE-AWARD CONTRACTING SYSTEM

CONTENTS

SUMMARY COMPARISON

As a result of actual DPACS site implementations and operations, estimates of both costs and benefits resulting from DPACS presented in this study have been reduced from prior analyses. As of the end of fiscal year 1992, all hardware implementation costs for the six ICPs have been incurred, with the exception of implementation costs at DPSC during fiscal year 1993. As addressed in Section 6, some costs are expected in 1993 and 1994 for hardware, software, and LAN equipment for the personal tier conversion. Benefits have begun to accrue at the first installation site, DISC. When all costs are inflated to fiscal year 1993 dollars, estimates of life cycle costs attributable to DPACS have been reduced from original estimates of $88.1 million in the DLA I^3 Cost/Benefits Analysis to a current estimate of $53.36 million, a more than 35 percent reduction. Both estimates included sunk costs as relevant to the analysis of DPACS. However, for purposes of financial analysis in this section sunk costs have been excluded in accordance with DLAM 7041.1, *Economic Analysis*. The largest cost reduction between the estimates is in software maintenance. The original analysis assumed a relationship between the DSAC level of effort based on existing staff availability, the current estimate used the hardware/software maintenance relationship for estimating.

This significant reduction in the estimated non-recurring and recurring costs of DPACS has been offset by a more than 50 percent reduction in the estimated cash savings resulting from DPACS functional benefits. The initial estimate of DPACS benefits in the *I^3 Cost/Benefits Analysis* identified possible cash savings of nearly $190 million. This estimate was increased to $220 million in the Milestone II revision as a result of an increase in the estimate of manpower savings from 363 to 401 FTE. Re-evaluation of the value of lead time reduction savings with the same manpower savings led to an updated Milestone II estimate of approximately $150 million.

Actual DPACS performance and other events since the last analysis was conducted in October 1991, have reduced the estimated numbers of FTE savings that will result and have also quantified the value of lead time reductions at a much lower level. Using an updated analysis and data from actual events, the savings from reduced safety level holdings has been greatly reduced. The result has been a reduction of estimated DPACS benefits in this analysis, to approximately $91 million.

Exhibit 7-1 summarizes the historical estimates of DPACS cost and benefit streams studied by the team and elaborated on in Section 4, while Exhibit 7-2 is a compilation of the study team documentation of actual and projected figures, as detailed in Sections 5 and 6.

DPACS historical costs and benefits

Historical estimates of DPACS costs and benefits are shown in Exhibit 7-1. The following qualifiers apply to them:

- the incremental DPACS costs are documented in Section 4 of this report (I^3 Milestone I Analysis) and represent the total DLA cost to perform the preaward contracting function with DPACS.
- all costs are converted to fiscal year 1993 dollars.
- each source of benefits is shown in fiscal year 1993 dollars. Net savings/(cost) are computed and discounted by year.
- sunk costs are not used in discounting calculations; differences in years excluded are a result of different report dates, hence sunk costs are for different time periods.

Exhibit 7-1
DPACS Historical Economics

	FY 85-88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	Total	Total w/o Sunk
Incremental DPACS Cost (FY 88 $$)	$7.9	$6.1	$11.0	$5.3	$3.0	$3.7	$5.9	$7.0	$5.3	$3.2	$5.1	$4.9	$5.7	$73.9	$65.9
FY 93 $$	$9.5	$7.3	$13.1	$6.3	$3.5	$4.4	$7.0	$8.3	$6.3	$3.8	$6.0	$5.8	$6.8	$88.1	$78.7
Milestone I Savings (FY 93 $$)															
FTE				363.0	363.0	363.0	363.0	363.0	363.0	363.0	363.0	363.0	363.0		
Personnel Savings				$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$113.3	$113.3
Lead Time (one time) - 12 days				25.7										25.7	25.7
Recurring Lead Time				5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	50.1	50.1
Total Benefits				$42.0	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$189.1	$189.1
Net Savings/(cost)	($9.5)	($7.3)	($13.1)	$35.7	$12.8	$11.9	$9.3	$8.0	$10.0	$12.6	$10.3	$10.5	$9.6	$101.0	$110.4
Discounted Savings/(cost)		($7.0)	($11.3)	$28.2	$9.2	$7.8	$5.5	$4.3	$4.9	$5.6	$4.2	$3.9	$3.2		$58.4
Sunk costs (FY 85-88)															
Milestone II Savings (FY 93 $$)															
FTE						401.0	401.0	401.0	401.0	401.0	401.0	401.0	401.0		
Personnel Savings						$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$102.5	$102.5
Lead Time (one time) - 21 days						48.6								48.6	48.6
Recurring Lead Time						8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	69.5	69.5
Total Benefits						$70.1	$21.5	$21.5	$21.5	$21.5	$21.5	$21.5	$21.5	$220.6	$220.6
Net Savings/(cost)	($9.5)	($7.3)	($13.1)	($6.3)	($3.5)	$65.7	$14.5	$13.2	$15.2	$17.7	$15.5	$15.7	$14.7	$132.4	$141.9
Discounted Savings/(cost)				($4.9)	($2.5)	$42.8	$8.6	$7.1	$7.4	$7.9	$6.3	$5.8	$4.9		$83.2
Sunk costs (FY 85-90)															
Milestone II (Update) Savings (FY 93 $$)															
FTE						401.0	401.0	401.0	401.0	401.0	401.0	401.0	401.0		
Personnel Savings						$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$102.5	$102.5
Lead Time (one time) - 21 days						9.7	7.2	2.9						19.8	19.8
Recurring Lead Time						1.8	3.0	3.6	3.6	3.6	3.6	3.6	3.6	26.2	26.2
Total Benefits						$24.3	$23.1	$19.3	$16.4	$16.4	$16.4	$16.4	$16.4	$148.5	$148.5
Net Savings/(cost)	($9.5)	($7.3)	($13.1)	($6.3)	($3.5)	$19.9	$16.1	$10.9	$10.1	$12.6	$10.3	$10.5	$9.6	$60.4	$69.8
Discounted Savings/(cost)				($4.9)	($2.5)	$12.9	$9.5	$5.9	$4.9	$5.6	$4.2	$3.9	$3.2		$42.7
Sunk costs (FY 85-90)															

DPACS actual/future costs and benefits

The historical estimates summarized above correlate to the summary of actual and future costs presented in Exhibit 7-2, with the following qualifiers:

- cost streams are from Sections 5 and 6 of our study.
- all costs are converted to fiscal year 1993 dollars.
- benefits are shown by category in fiscal year 1993 dollars, net savings/(cost) are computed and discounted by year.
- sunk costs are not used in discounting calculations; differences in years excluded are a result of different report dates, hence sunk costs are for different time periods.

Exhibit 7-2
DPACS Actual/Future Costs and Benefits ($ million)

	FY 87-91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	TOTAL	Excluding Sunk
Costs													
Investment	$22.42	$2.54	$1.80	$2.43	$1.57	$3.74	$1.59	$0.68	$0.33	$0.72	$2.94	$40.76	$15.80
Recurring costs	$2.84	$0.75	$0.84	$1.16	$0.90	$0.49	$0.35	$0.38	$0.46	$0.44	$0.27	$8.89	$5.29
Total Costs	$25.26	$3.29	$2.64	$3.59	$2.47	$4.23	$1.94	$1.05	$0.79	$1.16	$3.22	$49.65	$21.10
Costs (FY 93 $$)	$28.85	$3.42	$2.64	$3.59	$2.47	$4.23	$1.94	$1.05	$0.79	$1.16	$3.22	$53.36	$21.10
Savings (FY 93 $$)													
FTEs			286	286	286	286	286	286	286	286	286		
Personnel Savings		$0.76	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$83.43	$82.67
Paper reduction		$0.01	$0.05	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.53	$0.53
Lead time (One-time;10.5 days)		$0.00	$2.47	$1.87	$0.75	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5.08	$5.08
Lead Time (Recurring)		$0.00	$0.20	$0.35	$0.41	$0.41	$0.41	$0.41	$0.41	$0.41	$0.41	$3.39	$3.39
Total Savings	$0.00	$0.76	$11.90	$11.46	$10.40	$9.65	$9.65	$9.65	$9.65	$9.65	$9.65	$92.44	$91.67
Net Savings/(cost)	($28.85)	($2.65)	$9.25	$7.87	$7.93	$5.42	$7.72	$8.60	$8.86	$8.49	$6.43	$39.07	$70.58
DISCOUNTED CASH STREAMS													
Net Present Value			$8.83	$6.83	$6.25	$3.88	$5.03	$5.09	$4.77	$4.16	$2.86		$47.70
PV Total Cost			2.52	3.11	1.95	3.03	1.26	0.62	0.43	0.57	1.43		14.93
PV Total Savings			11.35	9.94	8.20	6.92	6.29	5.72	5.20	4.72	4.30		62.62

DPACS economic comparison

The significant reduction in estimated cash savings, accompanied by the smaller reduction in total system costs, has lowered the expected financial performance of the system as estimated by several standard tools of financial analysis. Exhibit 7-3 is a comparison of cost and benefit data from each of the studies and key economic analysis statistics for the current analysis, summarized in Exhibit 7-1, against our revised savings profile of actual and future estimated costs and benefits from Exhibit 7-2.

Exhibit 7-3
DPACS Economic Comparison ($ million)

	Milestone I	Milestone II	Milestone II Update	1993 Actual/Projected
Cost	$78.7	$78.7	$78.7	$21.1
Benefits	189.1	220.6	148.5	91.7
Net Savings	$110.4	$141.9	$69.8	$70.6
Discounted Net Savings	$58.4	$83.2	$42.7	$47.7
Internal Rate of Return	85%	213%	103%	N/A
Payback (years)	2.4	2.2	2.6	0.3
Savings/Investment Ratio	2.5	2.6	1.6	5.3
Base Year	1988	1990	1990	1993
Sunk Cost Years	FY 85-88	FY 85-90	FY 85-90	FY 87-92

The net present value (NPV) for the actual costs and benefits plus expected costs and benefits is shown with the summary of each set of data (total discounted savings). In accordance with DLAM 7041.1, this calculation uses a discount rate of 10 percent. The net present value represents the value of the sum of the cash flow in all years, discounted to some time.

The Milestone I document estimated DPACS incremental cost at $78.7 million, fiscal year 1993 dollars, excluding sunk costs (fiscal years 1985 - 1988). At the same time, benefits were estimated at $189.1 million, fiscal year 1993 dollars, resulting in a net savings of $110.9 million, fiscal year 1993 dollars. When discounted to fiscal year 1988, the net present value was $58.4 million (fiscal year 1993 dollars). Furthermore, the Milestone I document estimated that the discounted payback would occur in 2.4 years (excluding sunk costs) and the savings investment ratio was 2.5. These data represent an internal rate return of 85 percent (excluding sunk cost).

The Milestone II document increased total benefits 77 percent to $220.6 million (fiscal year 1993 dollars), but did not address costs (we have extended the Milestone I estimate for illustrative purposes). The result of an increase in sunk costs and an increase in benefits lowered the discounted payback to 2.2 years from 2.4 years, increased the savings to investment ratio to 2.6, and increased the internal rate of return to 213 percent.

In the update to the Milestone II document, benefits were lowered 33 percent to $148.5 million (fiscal year 1993 dollars). Again, this analysis did not address costs, and again Milestone I costs were used for illustrative purposes. The net result is an increase in the discounted payback period to 2.6 years from 2.2 years, a reduction in the savings to investment ratio to 1.6, and a reduction in the internal rate of return to 103 percent.

The current analysis estimates that actual and future costs total $21.1 million (fiscal year 1993 dollars). Associated benefits are estimated at $91.7 million (fiscal year 1993 dollars). The payback has been lowered to less than one year from 2.6 years and the savings to investment ratio increased to more than 5. The internal rate of return is incalculable because no year shows a net cost. This is primarily due to the elimination of sunk costs.

While these data cannot be compared to each other because each analysis was performed at different points in time of the development life cycle with different amounts of sunk costs, some points are evident. First, the net present value of the project was positive during all four points in the analysis. Secondly, the savings to investment ratio was greater than one at all points of the project.

Per DLA-LO instructions, the discounted payback period illustrates the time it will take DLA to recover investment costs occurring in fiscal years 1993 and subsequent. The payback for the combined actual and estimated costs and benefits scenario is approximately 4 months. In order to determine when payback would occur, the discounted cumulative benefits were compared to the discounted cumulative costs (both starting in fiscal year 1993). Once cumulative savings were greater than cumulative costs, interpolation was used to determine the exact point of payback.

The savings/investment ratio, or profitability index, is calculated by dividing the present value of the savings (less increases in maintenance costs) by the present value of the investment excluding operation costs starting in fiscal year 1993 and is 5.3 for this analysis. This ratio shows the relative profitability of the project, or the present value of the benefits per dollar of investment.

The declining trend in benefits is driven chiefly by our revised estimate of personnel savings and lead time. Current estimates based on DPSSO standards analysis indicate that DPACS will save approximately 286 FTE per year DLA-wide as compared to earlier analyses that estimated 401 FTE savings per year. Changes in the estimated length of lead time saved, down from 21 days to 10.5 days and the reduction in the cost saved per day of lead time saved also contributed the estimated declining benefits of DPACS estimates.

Sensitivity analysis

A sensitivity analysis was performed to determine the impacts of a change in the discount rate. All spreadsheets used in this analysis were re-run using a discount rate of 3.4 percent. This rate was based on the rates provided in Appendix C of OMB Circular A-94. As a result of this analysis it was determined that lowering the discount rate increases the NPV of the actual and estimated costs and benefits. Investment in DPACS still shows positive financial results. The results of this analysis are provided in Appendix C.

When a 3.4 percent discount rate is used to compute actual plus future costs and benefits, the present value (excluding sunk costs) increases to the following amounts:

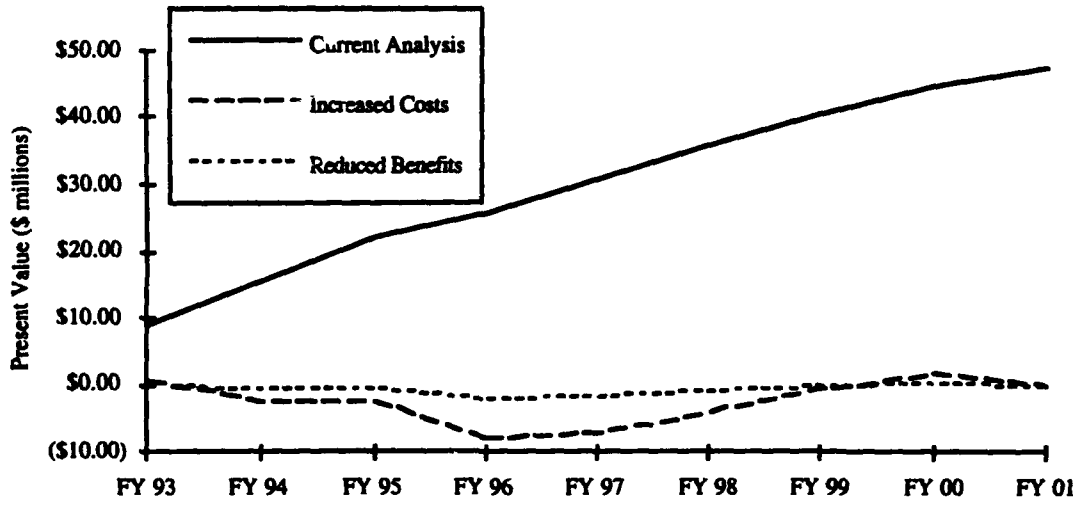
- PV Total Cost $18,560,000
- PV Cash Savings $79,630,000
- Total Net Present Value $61,080,000

Exhibit 7-4
DPACS Economic Comparison - 3.4% Discount Rate ($ million)

	Milestone I	Milestone II	Milestone II Update	1993 Actual/Projected
Cost	$78.7	$78.7	$78.7	$21.1
Benefits	189.1	220.6	148.5	91.7
Net Savings	$110.4	$141.9	$69.8	$70.6
Discounted Net Savings	$87.8	$127.7	$69.1	$61.1
Internal Rate of Return	85%	213%	103%	N/A
Payback (years)	2.4	2.2	2.6	0.3
Savings/Investment Ratio	2.7	3.1	2.0	5.4
Base Year	1988	1990	1990	1993
Sunk Cost Years	FY 85-88	FY 85-90	FY 85-90	FY 87-92

Costs and benefits can vary considerably without affecting the economics of the project. Further analysis demonstrated that benefits would have to be reduced by 76% to yield a NPV of zero. Conversely, costs would have to be increased 319% to yield a NPV of zero. Exhibit 7-5 illustrates the cummulative cash streams if costs increase 319 percent or the benefits decrease 76 percent.

Exhibit 7-5
DPACS Sensitivity to Changes in Costs and Benefits



Non-quantifiable benefits

In addition to the personnel reductions and reductions in administrative lead time, DPACS provides intangible benefits to its users and customers. The following summarizes some of the non-quantifiable benefits of DPACS:

Computer culture expansion

With the installation of the original DPACS workstations and advancements in technology, a new culture has developed within the ICPs that focuses on the use of personal computers to enhance productivity and communications in all aspects of business. Buyers/clerks take more pride in their work and feel that management values their contributions as evidenced by management's desire to automate (and improve) the processes associated with buyer/clerical positions in Contracting.

High quality products

The laser printer capability and on-line edit features of DPACS contribute to a high quality product for the customers. Contract documents and award packages are neat and are much easier to read. The automated clause selection feature reduces the possibility of incomplete award/solicitation packages being sent to vendors. In addition, the completeness and accuracy should reduce the number of vendor phone calls to Contracting after documents are received.

On-line access to current regulations

DPACS contains a wealth of information regarding contracting laws and regulations. Since buyers have on-line access to this data, which is easily updated, buyers will be more likely to thoroughly research and include all pertinent clauses. Once again, the automation of the contracting process leads to a higher quality product.

Recommendations

Throughout this economic analysis, we conducted an extensive documentation review and interview process. The documentation established a starting point for interviews with functional and technical personnel actively involved in the DPACS process at DLA. As our understanding, and appreciation of the complexity of DPACS has grown, we have been able to develop recommendations for further investigation and action. Our recommendations suggest areas where further analysis and scenario planning would provide increased value to the DPACS process and user community and could result in further cost and time savings.

Our recommendations span the spectrum of our analysis and include possibilities for further study, courses of action, and avenues for continued improvement within the scope of the DPACS program.

Maximize the use of electronic data interchange

The DPACS system is a prime candidate for electronic data interchange (EDI). While some purchase requests are currently solicited through EDI, more solicitations and vendor responses could be processed through the use of EDI. By electronically distributing solicitations to potential vendors, and receiving the vendor's responses via EDI, DLA could see several benefits. Benefits would range from substantially reduced mailing costs, reduced clerical time spent stuffing envelopes, a significant reduction in paper and printer use, and most of all, EDI would reduce lead time by eliminating the time that solicitations (and vendor responses) spend going through the mail.

Reduce reliance on paper forms

DPACS was developed to be an automated system to more efficiently produce solicitations and contracts by electronically automating the preaward and award contract functions. Although all information necessary to produce a purchase request and route it for review and referral is available electronically on DPACS, some centers are still reviewing and utilizing hard copy PRs. DPACS contains all data available from the hard copy PR, plus additional information required for preaward functions. As a result, unnecessary time is spent buy buyers printing hard copies, and paper that could have been avoided at a significant cost savings is being used.

Establish guidelines for cost estimating

A solid cost estimate, tied to the expected functionality of a proposed project, is a key beginning point for the development of an information system. Therefore, the methodology and documentation used to arrive at the cost estimate becomes important. Although some general parameters for information system cost estimating exist, both within and outside DLA, the Federal Government and the Secretary of Defense are placing more and more emphasis on initial cost estimates. By establishing guidelines for cost estimating, DLA would again be well prepared to deal with cost justification and would have greater confidence in the expected life cycle cost of a system. Some areas for consideration are:

- document the hardware environment of new system development,
- identify and document the skills of in-house development and maintenance personnel,
- document and monitor the functionality of the system under estimate.

ECONOMIC ANALYSIS OF THE DLA PRE-AWARD CONTRACTING SYSTEM

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GOVERNMENT FURNISHED MATERIAL
DPACS

Memo from D. McGillivary re: DPACS to Dr. Simonson

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DPACS and Quality Vendors

Staffing Guide for DISC-P

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DPACS

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PLFA Summary, Standard 1320, November 1992

SAMMS Project Development Plan (PDP), 27 September 1992 - 25 September 1993

Composite Time Values by PLFA, August 4, 1992

Contract Management Statistics, Post-Award FY 90 and FY 93

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DLAM re: Cost of Late Delivery, DLA-DORO Project Number 7003, June 29, 1988

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DLA PRE-AWARD CONTRACTING SYSTEM

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DPACS Contacts List

Name		Office Symbol	Room #	Topic
Carolyn	Altizer	DGSC-P	Bldg 33	DPACS - Operation
Gary	Banner	DESC-P		Operations Support
Angelia	Booker	DGSC-P	Bldg 33	DPACS Functionality
John	Bryant	DORO		CIT Workload Data
Jim	Butler	DPSSO	Bldg 33	Standards
Col J.	Carpenter	DLA-OM	Bldg 5 Dr10	C.I.T.
Marcia	Chapen	DLA-ZRM	3A558	Cost data
Vickie	Christensen	DLA-OM	Bldg 5 Dr10	CIT Workload Data
Marquita	Christopher	DGSC-P	Bldg 33	DPACS Workload/Personnel/PALT
Phil	Church	DLA-PS	4C121	Contracting
Deny	Coley	DGSC-P	Bldg 32	DPACS - Operation
Chris	Colsfol	DISC-PE	Bldg 36	Contracting Operations
Mark	Cunningham	DLA-CM	3D617	Actual Personnel Costs
John	DeSanto	DISC-Z	Bldg 3	HW Configuration-Lans
Bill	Eble	DSAC-OFP		Software Development
Joe	Famiglietti	DLA-PS	4C121	DPACS/Contracting
Linda	Fields	DLA-ZSS	3A675	Hardware Maintenance
Joe	Fudola	DISC-PR	Bldg 36	Post Award Modification
Jeanne	Gerwitz	DLA-ZSS	Bldg 3	Project Oversight
Peggy	Glasheen	DLA-CE	Bldg 3	Standards
Rose	Gordon	DGSC-PO	Bldg 32	Operations Support Division
Carl	Gulley	DPSSO	Bldg 33	Standards
Cheryl	Haines	DISC-RMO	Bldg 36	Lead Time
Jeff	Hammer	DGSC-P	Bldg 32	DPACS Workload/Personnel/PALT
Judy	Harroson	DLA-Z		Hardware Inventory Maintenance
Richard	Hoffman	DISC-A	Bldg5 F6	Contracting Processes
Ellenor	Holland	DESC-P		Operations Support
Brenda	Johnson	DGSC-P	Bldg 33	DPACS Functionality
Lou	Julg	DISC-RM	Bldg 36	Resource Data
Sandra	King	DLA-ZSM	3A675	Project Oversight
Scottie	Knott	DGSC-P	Bldg 33	Post Award
Dave	Lampe	DISC-AO	Bldg 5	Lead Time
Tom	Lanagan	DORO	Bldg 33	Lead Time
Mark	Lee	DPSSO	Bldg 33	DPACS Standards
Linda	Middleton	DISC-P	Bldg 36	Front End Validation
Mike	Pouy	DLA-OSP	Bldg 4	Supply Policy/Lead Time
Jan	Rider	DLA-LO	Bldg 3	COTR
Stan	Rimdzius	DISC-RMO	Bldg 36	Lead Time
Ed	Samocki	DISC-P	Bldg 36	Front End Validation
Sue	Schafer	DISC-POM	Bldg 36	Personnel Data
Valerie	Shepard	DLA-K		Personnel Data
John	Shivo	DISC-PPP	Bldg 36	Contracting Statistics

DPACS Contacts List

Name		Office Symbol	Room #	Topic
Phil	Silas	DACO		Actual Costs
Iola	Smith	DESC-P		ESOC Contracting
Barbara	Standard	DLA-C	Bldg 3	Budgets
Avis	Titcher	DISC-Z	Bldg 3	HW Configuration
Ken	Tomasello	DISC		
Kay	Vierra	DLA-OSS	4B260	Functional
Bill	White	DLA-ZS	3A675	Cost Data
Karen	Wilson	DESC-P		Functional Improvements
Mike	Yeatts	DPSSO	Bldg 32	DPACS Standards

ECONOMIC ANALYSIS OF THE DLA PRE-AWARD CONTRACTING SYSTEM

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DEFENSE LOGISTICS AGENCY
HEADQUARTERS
CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6100

29 JAN 1993

IN REPLY REFER TO DLA-DORO (Capt Dawson/DSN 695-4977)

SUBJECT: Analysis Support for SAMMS Enhancement Projects (DPAC, AIMS, ESEX)

TO: Peat Marwick
Mr. S. Daniel Johnson
2001 M. Street, N. W.
Washington, DC 20036

1. References:

a. Peat Marwick letter, 18 December 1992, regarding above subject.

b. Meeting between Peat Marwick & DLA-DORO, 14 January 1993 regarding above subject.

2. In responding to your request (Reference 1a), we have developed the workload estimates associated with purchase requests (PRs) for each Inventory Control Point (ICP). These historical work counts were derived from the All Active Contract File (ALLACF). They represent only those recommended buys (RBs) which survive in the system and become PRs. Provided at Enclosure 1 are the results of our data analysis for historical PRs.

3. The request for workload data dealing with the volume of standard supply control studies and the volume of RBs with reason codes by ICP is unavailable in our historical files. As discussed in referenced meeting, this type of workload data is available at each ICP for limited historical time periods. It is our recommendation that you seek these data from the ICPs.

4. With respect to your request for our office to update the dollar savings due to the decrease in lead time, we have updated these estimates. Provided at Enclosure 2 are the revised estimates for FY 91 and FY 92. These are based on the same total reduction in lead time (35 days) as was employed in the original study. As we discussed in our meeting, we have also conducted a sensitivity analysis on savings due to lead times as a function of the relative mix between Administrative Lead Time (ALT) versus Production Lead Time (PLT). Our conclusion, based on the use of the Industrial Commodity data, is that savings due to lead times are not sensitive to whether time is saved in PLT or ALT.

SUBJECT: Analysis Support for SAMMS Enhancement Projects (DPAC, AIMS, ESEX)

5. This completes our action on your request. If you have any questions regarding these findings, you may contact either Mr. Thomas Lanagan, (804) 279-4918 or Captain Edward Dawson, USAF, (804) 279-4977 at our office in Richmond.

Sincerely,

Jan Rider

2 Encl

JAN RIDER
Senior Study Director
for Economic Analysis

FY-89-92 VOLUME OF PURCHASE REQUESTS

Comm	FY 89		FY 90		FY 91		FY 92	
	Purchase Reqs	%	Purchase Reqs	%	Purchase Reqs	%	Purchase Reqs	%
C	334,576	0.29	307,634	0.30	338,536	0.31	266,653	0.29
E	194,088	0.17	172,551	0.17	173,193	0.16	144,231	0.15
G	225,430	0.20	218,332	0.21	235,495	0.21	206,976	0.22
I	200,805	0.18	181,656	0.18	183,506	0.17	153,031	0.16
M	162,432	0.14	129,323	0.13	141,554	0.13	138,810	0.15
T	29,948	0.03	24,922	0.02	24,256	0.02	22,557	0.02
DLA	1,147,279	1.00	1,034,418	1.00	1,096,540	1.00	932,258	1.00

TABLE A-1: FY-92 SAFETY LEVEL (SL) $ SAVINGS DUE TO REDUCED LEAD TIMES

Comm	Prob(BO)	#Req	BO Goal	Current System Constant	Reduced Lead Time System Constant	SL$ Current	SL$ w/Reduced Lead Time	SL$ Saved	SL$ Saved per Lead Time Day
C	0.17	3,691,069	630,909	267,954,832	244,280,784	5,389,000	3,657,000	1,732,000	49,486
E	0.09	2,552,242	239,177	214,148,240	195,507,568	14,657,000	10,495,000	4,162,000	118,914
G	0.17	2,613,423	446,671	325,669,888	297,203,456	10,687,000	7,398,000	3,289,000	93,971
I	0.11	5,486,319	615,119	302,130,688	277,941,248	20,910,000	16,162,000	4,748,000	135,657
M	0.09	1,412,918	124,338	131,001,520	113,120,112	8,227,000	5,472,000	2,755,000	78,714
T	0.14	1,539,173	210,824	1,310,794,496	1,226,820,860	145,943,000	122,599,000	23,344,000	666,971
DLA	0.16	17,295,144	2,798,573	2,551,699,664	2,354,874,028	205,813,000	165,783,000	40,030,000	1,143,714

TABLE A-1: FY-91 SAFETY LEVEL (SL) $ SAVINGS DUE TO REDUCED LEAD TIMES

Comm	Prob(BO)	#Req	BO Goal	Current System Constant	Reduced Lead Time System Constant	SL$ Current	SL$ w/Reduced Lead Time	SL$ Saved	SL$ Saved per Lead Time Day
C	0.13	3,738,903	468,140	286,074,880	262,331,344	9,803,000	6,873,000	2,930,000	83,714
E	0.07	2,780,638	205,289	221,371,104	202,594,832	23,369,000	17,160,000	6,209,000	177,400
G	0.13	2,747,752	358,826	378,953,984	346,256,384	22,399,000	16,300,000	6,099,000	174,257
I	0.11	5,633,787	626,590	329,272,576	304,910,336	24,617,000	19,196,000	5,421,000	154,886
M	0.09	1,469,063	126,383	192,647,872	168,818,096	8,106,000	5,249,000	2,857,000	81,629
T	0.20	1,965,461	388,553	1,449,325,312	1,357,031,170	84,893,000	71,224,000	13,669,000	390,543
DLA	0 12	18,335,604	2,198,329	2,857,645,728	2,641,942,162	173,187,000	136,002,000	37,185,000	1,062,429

ECONOMIC ANALYSIS OF THE DLA PRE-AWARD CONTRACTING SYSTEM

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Exhibit 4-7
DPACS Historical Costs and Benefits ($ million)
(3.4% discount rate)

	FY 85-88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	Total	Total w/o Sunk
Incremental DPACS Cost (FY 88 $$)	$7.9	$6.1	$11.0	$5.3	$3.0	$3.7	$5.9	$7.0	$5.3	$3.2	$5.1	$4.9	$5.7	$73.9	$65.9
FY 93 $$	$9.5	$7.3	$13.1	$6.3	$3.5	$4.4	$7.0	$8.3	$6.3	$3.8	$6.0	$5.8	$6.8	$88.1	$78.7
Milestone I Savings (FY 93 $$)															
FTE				363.0	363.0	363.0	363.0	363.0	363.0	363.0	363.0	363.0	363.0		
Personnel Savings				$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$11.3	$113.3	$113.3
Lead Time (one time) - 12 days				25.7										25.7	25.7
Recurring Lead Time				5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	50.1	50.1
Total Benefits				$42.0	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$16.3	$189.1	$189.1
Net Savings/(cost)	($9.5)	($7.3)	($13.1)	$35.7	$12.8	$11.9	$9.3	$8.0	$10.0	$12.6	$10.3	$10.5	$9.6	$101.0	$110.4
Discounted Savings/(cost)		($7.2)	($12.4)	$32.9	$11.4	$10.3	$7.8	$6.5	$7.8	$9.5	$7.5	$7.4	$6.5		
Sunk costs (FY 85-88)															$87.8
Milestone II Savings (FY 93 $$)															
FTE						401.0	401.0	401.0	401.0	401.0	401.0	401.0	401.0		
Personnel Savings						$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$102.5	$102.5
Lead Time (one time) - 21 days						48.6								48.6	48.6
Recurring Lead Time						8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	69.5	69.5
Total Benefits						$70.1	$21.5	$21.5	$21.5	$21.5	$21.5	$21.5	$21.5	$220.6	$220.6
Net Savings/(cost)	($9.5)	($7.3)	($13.1)	($6.3)	($3.5)	$65.7	$14.5	$13.2	$15.2	$17.7	$15.5	$15.7	$14.7	$132.4	$141.9
Discounted Savings/(cost)				($5.8)	($3.2)	$56.5	$12.1	$10.6	$11.8	$13.3	$11.2	$11.0	$10.0		
Sunk costs (FY 85-90)															$127.7
Milestone II (Update) Savings (FY 93 $$)															
FTE						401.0	401.0	401.0	401.0	401.0	401.0	401.0	401.0		
Personnel Savings						$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$12.8	$102.5	$102.5
Lead Time (one time) - 21 days						9.7	7.2	2.9						19.8	19.8
Recurring Lead Time						1.8	3.0	3.6	3.6	3.6	3.6	3.6	3.6	26.2	26.2
Total Benefits						$24.3	$23.1	$19.3	$16.4	$16.4	$16.4	$16.4	$16.4	$148.5	$148.5
Net Savings/(cost)	($9.5)	($7.3)	($13.1)	($6.3)	($3.5)	$19.9	$16.1	$10.9	$10.1	$12.6	$10.3	$10.5	$9.6	$60.4	$69.8
Discounted Savings/(cost)				($5.8)	($3.2)	$17.1	$13.4	$8.8	$7.8	$9.5	$7.5	$7.4	$6.5		
Sunk costs (FY 85-90)															$69.1

DPACS Actual and Future Costs and Benefits ($ million)
(3.4% discount rate)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	TOTAL	Sunk
Costs																	
Investment	$1.82	$7.24	$4.79	$3.38	$5.18	$2.54	$1.80	$2.43	$1.57	$3.74	$1.59	$0.68	$0.33	$0.72	$2.94	$40.76	$15.80
Recurring costs	$0.13	$0.51	$0.60	$0.76	$0.84	$0.75	$0.84	$1.16	$0.90	$0.49	$0.35	$0.38	$0.46	$0.44	$0.27	$8.89	$5.29
Total Costs	$1.94	$7.75	$5.39	$4.14	$6.02	$3.29	$2.64	$3.59	$2.47	$4.23	$1.94	$1.05	$0.79	$1.16	$3.22	$49.65	$21.10
Costs (FY 93 $$)	$2.40	$9.25	$6.19	$4.62	$6.39	$3.42	$2.64	$3.59	$2.47	$4.23	$1.94	$1.05	$0.79	$1.16	$3.22	$53.36	$21.10
Savings (FY 93 $$)																	
FTEs							286	286	286	286	286	286	286	286	286		
Personnel Savings						$0.76	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$9.19	$83.43	$82.67
Paper reduction						$0.01	$0.05	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.53	$0.53
Lead time (One-time;10.5 days)						$0.00	$2.47	$1.87	$0.75	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5.08	$5.08
Lead Time (Recurring)						$0.00	$0.20	$0.35	$0.41	$0.41	$0.41	$0.41	$0.41	$0.41	$0.41	$3.39	$3.39
Total Savings	$0.00	$0.00	$0.00	$0.00	$0.00	$0.76	$11.90	$11.46	$10.40	$9.65	$9.65	$9.65	$9.65	$9.65	$9.65	$92.44	$91.67
Net Savings/(cost)	($2.40)	($9.25)	($6.19)	($4.62)	($6.39)	($2.65)	$9.25	$7.87	$7.93	$5.42	$7.72	$8.60	$8.86	$8.49	$6.43	$39.07	$70.58
DISCOUNTED CASH STREAMS																	
Net Present Value							$9.10	$7.49	$7.29	$4.82	$6.64	$7.15	$7.13	$6.61	$4.84		$61.08
PV Total Cost							2.60	3.41	2.27	3.76	1.67	0.88	0.64	0.90	2.42		18.56
PV Total Savings							11.70	10.90	9.57	8.59	8.30	8.03	7.77	7.51	7.26		79.63

ECONOMIC ANALYSIS
OF THE
DLA PRE-AWARD CONTRACTING SYSTEM

CONTENTS

(FY 88 $000)

Element	Alternative 2 Total	Excluding Sunk Costs	Alternative 0 Total	Excluding Sunk Costs	Incremental Total	Excluding Sunk Costs	
NON RECURRING							
Contractor Provided							
Program Management	$0	$0	$0	$0	$0	$0	0.00%
Hardware							
ADPE	123,606	110,886	16,400	13,800	107,206	97,086	54.90%
Connectivity	11,581	11,144	1,600	1,200	9,981	9,944	5.62%
Remotes	0	0	0	0	0	0	0.00%
Software							
Development	1,923	850	800	600	1,123	250	0.14%
Commercial	3,213	2,701	0	0	3,213	2,701	1.53%
Documentation	236	204	0	0	236	204	0.12%
Test/Evaluation	0	0	0	0	0	0	0.00%
Tech/Integration	110	90	0	0	110	90	0.05%
Other	1,315	815	0	0	1,315	815	0.46%
Subtotal	$141,984	$126,690	$18,800	$15,600	$123,184	$111,090	
Government Provided							
Program Management	7,163	5,692	5,520	4,140	1,643	1,552	0.88%
Hardware							
ADPE	2,214	0	2,214	0	0	0	0.00%
Connectivity	0	0	0	0	0	0	0.00%
Remotes	0	0	0	0	0	0	0.00%
Software							
Development	20,135	6,361	0	0	20,135	6,361	3.60%
Commercial	0	0	0	0	0	0	0.00%
Documentation	878	878	0	0	878	878	0.50%
Test/Evaluation	2,214	2,184	0	0	2,214	2,184	1.24%
Tech/Integration	3,391	3,298	0	0	3,391	3,298	1.87%
Other	18,718	8,022	0	0	18,718	8,022	4.54%
Subtotal	$54,713	$26,435	$7,734	$4,140	$46,979	$22,295	
Support Investment							
Site Preparation	$550	$350	$0	$0	$550	$350	0.20%
Initial Training	6,921	6,325	0	0	6,921	6,325	3.58%
Subtotal	$7,471	$6,675	$0	$0	$7,471	$6,675	
Total Non-recurring	$204,168	$159,800	$26,534	$19,740	$177,634	$140,060	
RECURRING							
Contractor SW Maintenance	$11,176	$8,747	$10,228	$7,828	$948	$919	0.52%
Government SW Maintenance	120,631	103,913	164,752	123,564	(44,121)	(19,651)	-11.11%
ADPE Mainenance	105,628	89,138	68,372	52,372	37,256	36,766	20.79%
Other							
ADP Supplies	32,000	24,000	32,000	24,000	0	0	0.00%
Recurring Training	38,898	33,726	19,984	14,988	18,914	18,738	10.60%
Personnel Operating Costs	221,189	165,892	221,189	165,892	0	0	0.00%
Total Recurring Costs	$529,522	$425,416	$516,525	$388,644	$12,997	$36,772	
Total Undiscounted Costs	$733,690	$585,216	$543,059	$408,384	$190,631	$176,832	100.00%

(FY 88 $000)

Alternative 2 Breakdown

Element	DPACS	AIMS	Post Award	Recipt Proc	Discr Proc	CTOL	Other	Total	W/O Other
NON RECURRING									
Contractor Provided									
Program Management	$0	$0	$0	$0	$0	$0		$0	$0
Hardware									
ADPE	34,029	19,977	4,983	1,764	3,264	40,193	19,396	123,606	104,210
Connectivity	4,399	3,501	674	239	441	227	2,100	11,581	9,481
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	1,123	0	0	0	0	0	800	1,923	1,123
Commercial	1,695	1,213	131	46	84	43	0	3,213	3,213
Documentation	117	62	24	9	16	8	0	236	236
Test/Evaluation	0	0	0	0	0	0	0	0	0
Tech/Integration	60	50	0	0	0	0	0	110	110
Other	1,315	0	0	0	0	0	0	1,315	1,315
Subtotal	$42,738	$24,803	$5,812	$2,058	$3,805	$40,471	$22,296	$141,984	$119,688
Government Provided									
Program Management	N/A	N/A	N/A	N/A	N/A	N/A	7,163	$7,163	$0
Hardware									
ADPE	0	0	0	0	0	0	2,214	2,214	0
Connectivity	0	0	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	N/A	N/A	N/A	N/A	N/A	N/A	20,135	20,135	0
Commercial	0	0	0	0	0	0	0	0	0
Documentation	0	0	0	0	0	0	878	878	0
Test/Evaluation	232	137	38	13	25	13	1,756	2,214	458
Tech/Integration	1,249	660	258	91	168	87	878	3,391	2,513
Other	0	0	0	0	0	0	18,718	18,718	0
Subtotal	$1,481	$797	$296	$104	$193	$100	$51,742	$54,713	$2,971
Support Investment									
Site Preparation	$300	$250	$0	$0	$0	$0	$0	$550	$550
Initial Training	2,638	1,353	501	177	328	169	1,756	6,921	5,165
Subtotal	$2,938	$1,603	$501	$177	$328	$169	$1,756	$7,471	$5,715
Total Non-recurring	$47,156	$27,203	$6,609	$2,340	$4,327	$40,740	$75,794	$204,168	$128,374
RECURRING									
Contractor SW Maintenance	$540	$410	$0	$0	$0	$0	$10,228	$11,178	$950
Government SW Maintenance	0	0	0	0	0	0	120,631	120,631	0
ADPE Mainenance	13,990	7,676	1,458	646	1,201	10,635	70,022	105,628	35,606
Other									
ADP Supplies	0	0	0	0	0	0	32,000	32,000	0
Recurring Training	9,544	5,002	1,788	691	1,277	618	19,984	38,903	18,919
Personnel Operating Costs	0	0	0	0	0	0	221,189	221,189	0
Total Recurring Costs	$24,074	$13,088	$3,246	$1,337	$2,478	$11,253	$474,054	$529,529	$55,475
Total Undiscounted Costs	$71,230	$40,291	$9,855	$3,676	$6,805	$51,993	$549,848	$733,698	$183,850
	38.7%	21.9%	5.4%	2.0%	3.7%	28.3%			100.0%

(FY 88 $000)

Alternative 0 Breakdown

Element	DPACS	AIMS	Post Award	Recipt Proc	Discr Proc	CTOL	Other	Total	W/O Other
NON RECURRING									
Contractor Provided									
Program Management	$0	$0	$0	$0	$0	$0	$0	$0	$0
Hardware									
ADPE	0	0	0	0	0	0	16,400	16,400	0
Connectivity	0	0	0	0	0	0	1,600	1,600	0
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	0	0	0	0	0	0	800	800	0
Commercial	0	0	0	0	0	0	0	0	0
Documentation	0	0	0	0	0	0	0	0	0
Test/Evaluation	0	0	0	0	0	0	0	0	0
Tech/Integration	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0
Subtotal	$0	$0	$0	$0	$0	$0	$18,800	$18,800	$0
Government Provided									
Program Management	N/A	N/A	N/A	N/A	N/A	N/A	5,520	$5,520	$0
Hardware									
ADPE	0	0	0	0	0	0	2,214	2,214	0
Connectivity	0	0	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0
Commercial	0	0	0	0	0	0	0	0	0
Documentation	0	0	0	0	0	0	0	0	0
Test/Evaluation	0	0	0	0	0	0	0	0	0
Tech/Integration	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0
Subtotal	$0	$0	$0	$0	$0	$0	$7,734	$7,734	$0
Support Investment									
Site Preparation	$0	$0	$0	$0	$0	$0	$0	$0	$0
Initial Training	0	0	0	0	0	0	0	0	0
Subtotal	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Non-recurring	$0	$0	$0	$0	$0	$0	$26,534	$26,534	$0
RECURRING									
Contractor SW Maintenance	$0	$0	$0	$0	$0	$0	$10,228	$10,228	$0
Government SW Maintenance	0	0	0	0	0	0	164,752	164,752	0
ADPE Mainenance	0	0	0	0	0	0	68,372	68,372	0
Other									
ADP Supplies	0	0	0	0	0	0	32,000	32,000	0
Recurring Training	0	0	0	0	0	0	19,984	19,984	0
Personnel Operating Costs	0	0	0	0	0	0	221,189	221,189	0
Total Recurring Costs	$0	$0	$0	$0	$0	$0	$516,525	$516,525	$0
Total Undiscounted Costs	$0	$0	$0	$0	$0	$0	$543,059	$543,059	$0
	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%

(FY 88 $000)

Incremental Cost Breakdown

Element	DPACS	AIMS	Post Award	Recipt Proc	Discr Proc	CTOL	Other	Total	W/O Other
NON RECURRING									
Contractor Provided									
Program Management	$0	$0	$0	$0	$0	$0	$0	$0	$0
Hardware									
ADPE	34,029	19,977	4,983	1,764	3,264	40,193	2,996	107,206	104,210
Connectivity	4,399	3,501	674	239	441	227	500	9,981	9,481
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	1,123	0	0	0	0	0	0	1,123	1,123
Commercial	1,695	1,213	131	46	84	43	0	3,213	3,213
Documentation	117	62	24	9	16	8	0	236	236
Test/Evaluation	0	0	0	0	0	0	0	0	0
Tech/Integration	60	50	0	0	0	0	0	110	110
Other	1,315	0	0	0	0	0	0	1,315	1,315
Subtotal	$42,738	$24,803	$5,812	$2,058	$3,805	$40,471	$3,496	$123,184	$119,688
Government Provided									
Program Management	0	0	0	0	0	0	1,643	$1,643	$0
Hardware									
ADPE	0	0	0	0	0	0	0	0	0
Connectivity	0	0	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0	0	0
Software									
Development	0	0	0	0	0	0	20,135	20,135	0
Commercial	0	0	0	0	0	0	0	0	0
Documentation	0	0	0	0	0	0	878	878	0
Test/Evaluation	232	137	38	13	25	13	1,756	2,214	458
Tech/Integration	1,249	660	258	91	168	87	878	3,391	2,513
Other	0	0	0	0	0	0	18,718	18,718	0
Subtotal	$1,481	$797	$296	$104	$193	$100	$44,008	$46,979	$2,971
Support Investment									
Site Preparation	$300	$250	$0	$0	$0	$0	$0	$550	$550
Initial Training	2,638	1,353	501	177	328	169	1,756	6,921	5,165
Subtotal	$2,938	$1,603	$501	$177	$328	$169	$1,756	$7,471	$5,715
Total Non-recurring	$47,156	$27,203	$6,609	$2,340	$4,327	$40,740	$49,260	$177,634	$128,374
RECURRING									
Contractor SW Maintenance	$540	$410	$0	$0	$0	$0	$0	$950	$950
Government SW Maintenance	0	0	0	0	0	0	(44,121)	(44,121)	0
ADPE Mainenance	13,990	7,676	1,458	646	1,201	10,635	1,650	37,256	35,606
Other									
ADP Supplies	0	0	0	0	0	0	0	0	0
Recurring Training	9,544	5,002	1,788	691	1,277	618	0	18,919	18,919
Personnel Operating Costs	0	0	0	0	0	0	0	0	0
Total Recurring Costs	$24,074	$13,088	$3,246	$1,337	$2,478	$11,253	($42,471)	$13,004	$55,475
Total Undiscounted Costs	$71,230	$40,291	$9,855	$3,676	$6,805	$51,993	$6,789	$190,639	$183,850
	38.7%	21.9%	5.4%	2.0%	3.7%	28.3%			100.0%

(FY 88 $000)

Incremental Cost Plus Other Breakdown

Element	DPACS	AIMS	Post Award	Recipt Proc	Discr Proc	CTOL	Total
NON RECURRING							
Contractor Provided							
Program Management	$0	$0	$0	$0	$0	$0	$0
Hardware							
ADPE	35,190	20,634	5,144	1,824	3,375	41,040	107,206
Connectivity	4,593	3,611	701	249	460	368	9,981
Remotes	0	0	0	0	0	0	0
Software							
Development	1,123	0	0	0	0	0	1,123
Commercial	1,695	1,213	131	46	84	43	3,213
Documentation	117	62	24	9	16	8	236
Test/Evaluation	0	0	0	0	0	0	0
Tech/Integration	60	50	0	0	0	0	110
Other	1,315	0	0	0	0	0	1,315
Subtotal	$44,092	$25,570	$5,999	$2,128	$3,935	$41,460	$123,184
Government Provided							
Program Management	637	360	88	33	61	465	$1,643
Hardware							
ADPE	0	0	0	0	0	0	0
Connectivity	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0
Software							
Development	7,801	4,413	1,079	403	745	5,694	20,135
Commercial	0	0	0	0	0	0	0
Documentation	340	192	47	18	32	248	878
Test/Evaluation	912	522	132	48	90	510	2,214
Tech/Integration	1,589	852	305	109	200	335	3,391
Other	7,252	4,102	1,003	374	693	5,293	18,718
Subtotal	$18,531	$10,441	$2,655	$984	$1,822	$12,546	$46,979
Support Investment							
Site Preparation	$300	$250	$0	$0	$0	$0	$550
Initial Training	3,318	1,737	595	213	393	665	6,921
Subtotal	$3,618	$1,987	$595	$213	$393	$665	$7,471
Total Non-recurring	$66,241	$37,998	$9,249	$3,325	$6,150	$54,671	$177,634
RECURRING							
Contractor SW Maintenance	$540	$410	$0	$0	$0	$0	$950
Government SW Maintenance	(17,094)	(9,669)	(2,365)	(882)	(1,633)	(12,477)	(44,121)
ADPE Mainenance	14,629	8,038	1,546	679	1,262	11,102	37,256
Other							
ADP Supplies	0	0	0	0	0	0	0
Recurring Training	9,544	5,002	1,786	691	1,275	617	18,914
Personnel Operating Costs	0	0	0	0	0	0	0
Total Recurring Costs	$7,619	$3,780	$967	$487	$904	($759)	$12,999
Total Undiscounted Costs	$73,860	$41,779	$10,217	$3,812	$7,054	$53,912	$190,634

DPACS Original I Cubed Incremental Cost Estimate

Constant FY 88 $000

	FY85-88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Incremental DPACS Quantities													
INVESTMENT:													
Hardware													
Workstations	482	557	915	335	120	301	618	915	335	120	301	618	915
workstations excessed	0	0	0	0	120	301	618	915	335	120	301	618	915
cum workstat owned	482	1,039	1,954	2,289	2,289	2,289	2,289	2,289	2,289	2,289	2,289	2,289	2,289
DMINS	4	1	1	0	0	0	1	1	2	1	1	0	0
DMINS excessed	0	0	0	0	0	0	1	1	2	1	1	0	0
cum DMINS owned	4	5	6	6	6	6	6	6	6	6	6	6	6
NIPS	7	45	65	12	3	3	45	65	12	3	3	45	65
NIPS excessed	1	0	0	0	3	3	45	65	12	3	3	45	65
cum NIPS owned	6	51	116	128	128	128	128	128	128	128	128	128	128
LANS	0	0	24	11	0	0	0	0	0	0	0	0	0

DPACS Original I Cubed Incremental Cost Estimate

Constant FY 88 $000

Element	FY85-88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	Total
NON RECURRING														
Contractor Provided														
Program Management	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Hardware														
ADPE	4,531	2,946	4,951	1,301	460	1,129	3,172	4,371	2,620	1,120	2,369	2,512	3,711	35,190
Connectivity	0	194	2,412	1,107	0	0	0	0	0	0	603	277	0	4,593
Software														
Development	873	250	0	0	0	0	0	0	0	0	0	0	0	1,123
Commercial	396	143	178	32	12	29	149	178	210	101	118	60	89	1,695
Documentation	9	10	15	6	2	5	11	16	6	2	5	11	16	117
Test/Evaluation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tech/Integration	20	5	5	0	0	0	5	5	10	5	5	0	0	60
Other	500	655	160	0	0	0	0	0	0	0	0	0	0	1,315
Subtotal	$6,328	$4,202	$7,721	$2,446	$474	$1,163	$3,337	$4,570	$2,846	$1,228	$3,101	$2,860	$3,816	$44,092
Government Provided														
Program Management	$36	$122	$197	$51	$26	$26	$26	$26	$26	$26	$26	$26	$26	$637
Hardware														
ADPE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Connectivity	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remotes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Software														
Development	5,334	1,088	1,380	0	0	0	0	0	0	0	0	0	0	7,801
Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Documentation	0	170	170	0	0	0	0	0	0	0	0	0	0	340
Test/Evaluation	29	359	370	9	3	9	21	30	17	7	12	17	26	912
Tech/Integration	94	276	345	64	23	57	118	175	64	23	57	118	175	1,589
Other	4,141	1,037	1,037	1,037	0	0	0	0	0	0	0	0	0	7,252
Subtotal	$9,635	$3,053	$3,498	$1,162	$52	$92	$165	$230	$107	$56	$95	$161	$226	$18,531

DPACS Original I Cubed Incremental Cost Estimate

Constant FY 88 $000

	FY85-88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	Total
Support Investment														
Site Preparation	$200	$50	$50	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$300
Initial Training	594	976	1,375	374	0	0	0	0	0	0	0	0	0	3,318
Subtotal	$794	$1,026	$1,425	$374	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,618
Total Non-recurring	$16,757	$8,281	$12,644	$3,982	$526	$1,255	$3,502	$4,800	$2,953	$1,284	$3,196	$3,021	$4,042	$66,241
RECURRING														
Contractor SW Maintenance	$29	$36	$43	$43	$43	$43	$43	$43	$43	$43	$43	$43	$43	$540
Government SW Maintenance	(9,475)	(3,144)	(3,436)	(1,039)	0	0	0	0	0	0	0	0	0	(17,094)
ADPE Mainenance	439	564	1,003	1,436	1,574	1,574	1,498	1,304	1,470	998	998	994	776	14,629
Other														
ADP Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recurring Training	174	376	707	829	829	829	829	829	829	829	829	829	829	9,544
Personnel Operating Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Recurring Costs	($8,833)	($2,168)	($1,682)	$1,269	$2,446	$2,446	$2,370	$2,176	$2,342	$1,870	$1,870	$1,866	$1,648	$7,619
Total Undiscounted Costs (FY 88$)	$7,924	$6,113	$10,962	$5,251	$2,972	$3,701	$5,872	$6,976	$5,295	$3,153	$5,066	$4,887	$5,690	$73,860
Total UndiscountedCosts (FY 93 $)	$9,454	$7,293	$13,078	$6,264	$3,545	$4,415	$7,005	$8,322	$6,317	$3,762	$6,044	$5,830	$6,788	$88,117
Discounted Cost (FY 93$)	$9,454	$6,956	$11,340	$4,938	$2,541	$2,876	$4,149	$4,481	$3,092	$1,674	$2,445	$2,144	$2,269	$58,358

ECONOMIC ANALYSIS OF THE DLA PRE-AWARD CONTRACTING SYSTEM

CONTENTS

DPACS Actual/Future Costs

	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	TOTAL (Through FY97)	TOTAL (Through FY01)
Recurring Costs																	
Gov't Software Maintenance	0	0	0	0	0	0	0	238,610	102,870	102,870	102,870	102,870	102,870	102,870	102,870	0	958,700
software maintenance (DMINS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
software maint commercial	0	0	0	0	0	0	0	0	0	1,222	3,666	4,888	14,116	6,110	6,110	0	36,111
Gov't Hardware Maintenance																	
DMINS	96,000	384,000	403,200	529,200	600,000	600,000	600,000	600,000	480,000	249,228	147,684	36,912	46,139	46,139	46,139	2,612,400	4,864,641
Workstations	27,020	112,709	169,073	184,675	156,357	71,878	145,280	236,014	215,789	82,154	26,473	146,062	226,586	206,351	69,198	721,712	2,075,620
NIPS	3,091	17,780	28,581	31,297	60,990	59,317	71,165	67,389	78,760	31,424	42,836	64,032	52,805	55,711	27,799	201,055	692,977
LANS	0	0	0	13,862	22,303	22,303	22,303	22,303	22,303	22,303	22,303	22,303	22,303	22,303	22,303	58,468	259,193
ADP Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recurring Training Costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL RECURRING COST	$126,111	$514,489	$600,854	$759,033	$839,649	$753,498	$838,748	$1,164,316	$899,722	$489,200	$345,831	$377,066	$464,819	$439,484	$274,419	$3,593,635	$8,887,241
GRAND TOTAL:	$1,943,336	$7,753,176	$5,393,873	$4,143,803	$6,021,231	$3,294,504	$2,643,309	$3,589,692	$2,470,206	$4,231,620	$1,935,832	$1,053,849	$793,355	$1,158,484	$3,219,257	$28,549,922	$49,645,527

DPACS Actual/Future Costs

INVESTMENT:	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	TOTAL (Through FY99)	TOTAL (Through FY01)
Hardware																	
DMINS	$630,730	$1,290,848	$630,730	$669,648	$32,913	$0	$0	$0	$285,762	$571,524	$285,762	$285,762	$0	$0	$0	$3,254,869	$4,683,679
Workstations	540,408	2,102,135	1,663,112	565,296	2,405,427	1,369,233	0	0	529,460	2,285,886	1,153,302	0	0	529,460	2,285,886	9,645,611	15,429,605
NUPS	61,815	293,785	261,930	21,371	1,104,384	22,500	277,992	328,536	189,540	658,952	37,908	277,992	328,536	189,540	658,952	1,765,785	4,713,733
LANS	0	0	0	411,284	105,508	0	59,500	126,000	0	0	0	0	0	0	0	516,792	702,292
subtotal																$14,183,057	$25,529,309
Software																	
Development-Contractor	$0	$2,967,648	$1,852,976	$1,856,739	$920,641	$651,345	$620,500	$949,400	$0	$0	$0	$0	$0	$0	$0	$7,249,349	$8,819,249
Development-Gov't	584,271	584,271	584,271	584,271	584,271	497,928	746,569	814,639	280,303	135,748	67,870	67,870	0	0	0	3,419,285	5,532,077
Commercial (ea workstation)	0	0	0	0	0	0	65,000	140,000	0	0	0	0	0	0	0	0	205,000
Commercial (ea DMINS)	0	0	0	76,160	0	0	0	0	45,159	90,318	45,159	45,159	0	0	0	76,160	301,955
s/w enhance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
subtotal																$10,744,794	$14,858,280
Software Documentation																	
Gov't system documentation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial documentation (w/s)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
subtotal																$0	$0
Test and Evaluation																	
Gov't software	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
T & E (workstations)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
T & E (DMINS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
subtotal																$0	$0
Tech/Integ Support																	
Tech & Integ Supp (DMINS)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tech & Integ Supp (workstn)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
workstn s/w h/w migrn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
subtotal																$0	$0
Program Management																	
Gov't Program Management	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other																	
Non-SAMMS related DSAC staff	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Site Preparation	0	0	0	0	28,437	0	0	0	0	0	0	0	0	0	0	$28,437	$28,437
Initial training costs	0	0	0	0	0	0	0	0	240,260	0	0	0	0	0	0	0	240,260
Travel	0	0	0	0	0	0	35,000	67,000	0	0	0	0	0	0	0	0	102,000
subtotal																$28,437	$370,697
TOTAL INVESTMENT	$1,817,224	$7,238,687	$4,793,019	$3,384,769	$5,181,581	$2,541,006	$1,804,561	$2,425,375	$1,570,484	$3,742,420	$1,590,001	$676,783	$328,536	$719,000	$2,944,838	$24,956,289	$40,758,286

DPACS Actual/Future Costs

	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01
INVESTMENT:															
Hardware															
Workstations	139	610	587	250	1003	501	0	0	230	993	501	0	0	230	993
Workstations excessed	0	0	0	0	0	501	0	0	230	993	501	0	0	230	993
cum workstat owned	139	749	1336	1586	2589	2589	2589	2589	2589	2589	2589	2589	2589	2589	2589
DMINS	1	2	1	1	0	0	0	0	1	2	1	1	0	0	0
DMINS excessed	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0
cum DMINS owned	1	3	4	5	5	5	5	5	5	5	5	5	5	5	5
NIPS	4	23	26	2	476	3	22	26	15	476	3	22	26	15	476
NIPS excessed	1	0	0	0	0	3	22	26	15	476	3	22	26	15	476
cum NIPS owned	3	26	52	54	530	530	530	530	530	530	530	530	530	530	530
LANS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cum LANS owned	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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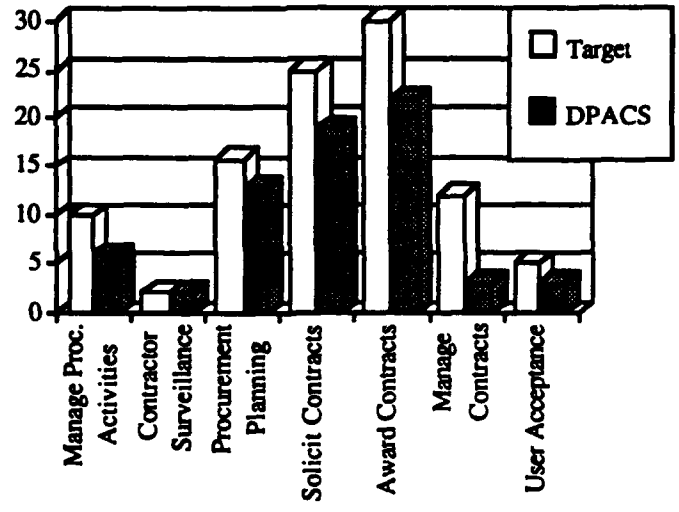
APPENDIX G
FUTURE CONSIDERATIONS

Functionality of the DoD system

As DoD consolidates and reviews its business processes, certain information systems will be required to support a new DoD environment. In recent months, procurement related information systems have been analyzed by the CIM Procurement Council in order to determine what existing system or systems best meet DoD's anticipated needs. DPACS was selected by the CIM Procurement Council as the DoD migration system for procurement activities.

The migration system is supposed to serve as the prelude to a standard system; until a standard system is adopted, procured, or designed, the migration system should be used by the DoD components. When selecting the migration system, the CIM Procurement Council judged each system against a set of criteria to determine which system contained the functionality that is expected in a standard or target system. However, the target system has only been defined in terms of a concept paper as of the date of this analysis. Seven major functional activities were examined when the CIM Procurement Council analyzed the potential migration systems: manage procurement activities, contractor surveillance, procurement planning, solicit contracts, award contracts, manage contracts, and user acceptance. Exhibit G-1 below summarizes DPACS' scores in each of these categories compared to the future target system.

Exhibit G-1
DPACS vs. Target - Functional Capabilities



Based on the CIM Procurement Council's review, DPACS scored 68 out of 100 possible points. The biggest shortfall appears to be in the "manage contracts" category. However, most of these functions are provided by an interface between DPACS and the Mechanization Of Contract Administration System (MOCAS) which was also chosen as a standard system.

Because DPACS was designed to meet the DLA requirements for a preaward system, DPACS was developed to rely on MOCAS for contract administration functions. Despite the fact that DPACS performed the required functions through MOCAS, the CIM Procurement Council downgraded DPACS because DPACS itself did not perform the required functions.

DPACS was also downgraded in the areas of soliciting and awarding contracts for similar reasons. Again, DPACS was designed to meet DLA's preaward requirements. Some of the criteria that DPACS failed to meet related to weapon system capabilities that DPACS was not designed to meet. To achieve these areas of functionality, additional developmental programming investment will be required.

Cost for development

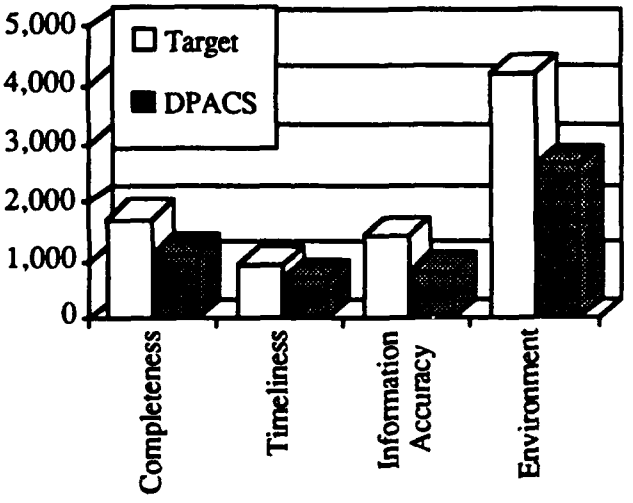
Since future system functionality has not been defined by DoD as of the date of this analysis, cost estimating is impossible at this time. There are several alternatives available to DoD for developing a standard system. First, DoD could use DPACS as a baseline and add to the baseline based on the required DoD functionality that is not contained in DPACS. Secondly, DoD could start from scratch and build a DoD system from the ground up, using the best concepts from each of the systems that exist today. Somewhere in between these alternatives lies yet another alternative. Such an alternative would be to take DPACS as it exists today and attempt to add modules of other systems to attain full DoD functionality. The list of alternatives available to DoD could go on forever.

Associated with these alternatives are certain risk and cost consequences. DoD should attempt to define each alternative and make broad assessments of technical and cost ramifications. Once the alternatives are defined, an economic analysis could be performed to analyze which alternative is the most economically sound, given technical considerations.

DoD system benefits

The additional functionality that should occur as a result of the development of a DoD standard system for preaward contracting should have a positive impact on both productivity and total lead time. It should also facilitate the move towards paperless processing of procurement activities. The CIM target system should bring functionality up to a score of 100 points out of a possible 100 points. Four major categories of functionality were examined when evaluating possible migration systems; completeness, timeliness, information accuracy, and environment. Exhibit G-2 graphically illustrates the differences between the current DPACS and the target DoD standard system.

Exhibit G-2
DPACS vs. Target - Key Attributes



Potential benefit areas for a DoD system identified by Peat Marwick do not necessarily fall under one distinct category but may provide some of the benefits described below.

Productivity

The added capabilities should increase productivity. There should be a positive impact on buyers, supervisors, and clerical personnel as demonstrated by DPACS. The DoD system should be able to process both weapon system items, consumables, and repairables. These requirements are essential to allowing the various military services to perform all preaward contracting functions in a consistent, automated fashion. In addition, the added functionality should bring all organizations up to the same levels of productivity.

Expert systems. Expert systems will probably be a component of the target system. Many tasks will be performed by the system with little or no human intervention. The system may be able to put together a draft solicitation or award package, and depending on confidence factors, issue the solicitation or award without human intervention. This would free up a great deal of time which could be spent performing non-routine tasks, or eliminate some labor altogether.

Electronic imaging. Electronic imaging is another feature that will dramatically increase productivity. This capability will virtually eliminate lost productivity for time spent searching for lost/missing folders and files. This feature will also increase productivity in procurement support areas. Attorneys and analysts will be able to gain access to DAR Council regulations by consulting one precise and up-to-date source.

Total lead time

Total lead time should also be reduced when the standard system is complete. The added features combined with the current DPACS (which reduced lead time upon implementation) should provide additional lead time reductions that allow for safety stock reduction.

Electronic access to other Federal agencies, vendors, and contract administration staffs will allow an immediate interface and thus reduce time spent relaying hard copy files and associated information. The increase in productivity resulting from electronic imaging described above will also impact lead time.

Conclusion

The DPACS system that was originally designed to meet DLA requirements forms the foundation on which the future target system will be based. Although the exact functions of the target system have not yet been defined, it is clear that the new DoD standard system will be an outgrowth of today's DPACS, and will require additional costs to develop while yielding benefits beyond those of the existing system.

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APPENDIX H
EXPECTED BENEFITS

This Appendix contains a summary of the benefits expected from the implementation of DPACS. These benefits were taken from an analysis performed by DLA called *I³ Benefits Analysis, Milestone II*, dated March 27, 1990. In the 1990 benefits analysis, DLA documented what areas they felt DPACS would benefit. The expected benefits listed below helped to form a starting point in the benefit identification process.

DLA pre award contracting system (DPACS)

DPACS consists of three major segments of contract modernization. These are: Purchase Request (PR) Management, Automated Solicitations Process, and an Automated Award system.

Purchase request management

Electronic image

Electronic Image of Mechanically Assigned and Prioritized PRs: When Supply inputs a PR into the system, it is printed and routed to Contracting. It is then assigned to a branch, a team and then a buyer. The PR then sits until the buyer has an opportunity to work on it. The prioritization can vary depending upon the buyer, but usually the importance depends upon where it is located in the pile. The current method leaves to chance that two PRs for the same or similar items will be combined. DPACS leaves none of this to chance. PRs are "banked" and stored until the buyer is ready for more work. The system then assigns the highest priority PR and any other PRs for the same or similar items.

On-line update of PR data

When a PR is modified, it must be reprinted and routed like a new PR to the buyer who is responsible for the procurement. If this process is not completed prior to issuance of the solicitation, a modification must be issued and the closing date extended. DPACS will modify the PR quickly.

Electronic referral of PRs

Whenever a PR is referred to another directorate, (i.e., Supply or Technical) the buyer must make copies, fill out forms to request action and input exception data to prevent this time from being charged to Contracting. DPACS will do this automatically and will also allow PRs to be transferred from buyer to buyer.

PR tracking and control

When someone needs to know status on a PR, they must access the system to identify the buyer code and then have the buyer review their files manually. DPACS will allow this entire process to be done on the system automatically.

Workload measurement

Every 2 weeks, a report is run to provide a listing, by team and buyer, of PRs being worked. Upon review of this report the Contracting Officer can modify future assignment of work to maintain peak performance. DPACS will

allow this to be updated on the system daily. The Contracting Officer can, therefore, keep better control on the backlog for each buyer.

Automated solicitation

Mechanical form preparation

As congress modifies statutes, our clauses and standard forms must be changed as necessary. Under current methods, to print and distribute new forms to the buying activities is a lengthy and costly process. Even with the new forms distributed, an old form could be used in error. DPACS will automatically update forms and provide the newer versions to the appropriate activities. This on-line capability reduces distribution time and erroneous use of old forms.

Automated bidders mailing list

Currently, lists of bidders are generated on new buyers, but these lists can be very outdated. To modify these lists, forms must be filled put, input, and checked on the next buy to determine if the list was corrected. The process is generally tedious and error prone. DPACS automates much of the process with the inclusion of firms that submit bids. DPACS also provides the capability to list only those firms which fit into special categories, such as small businesses or labor surplus areas.

Automated clause selection

When a buyer is putting together a solicitation, he generally uses a reference sheet that indicates when clauses are appropriate. This reference is created manually and must be maintained on a regular basis. For special clauses, the buyer must research the FARs (Federal Acquisition Regulations) to determine if a particular clause is appropriate. In either case, the buyer usually has to use pre-printed forms that include numerous clauses. The buyer must check the boxes next to clauses that are included in the solicitation. DPACS selects clauses based on the estimated cost, the item, or set-asides. On clauses that could be appropriate, DPACS alerts the buyer or a decision. DPACS also includes only those clauses selected and thereby saves pages in the solicitation.

Automated clause fill-in

Certain clauses require the buyer to fill in need information. If the buyer forgets, a modification must be issued to amend the clause. DPACS alerts the buyer to any clause that requires fill in information and checks the accuracy of the data.

Automated award

Receives and stores offers

As offers are received, the bid clerk notes their receipt and locks them in a safe until bid opening. The offers are then read and recorded on a standard form. This information is then transferred to the buyer. DPACS provides for the offers to be put into the system, thus making the data available to the buyer at the time of the bid opening. The system also includes safeguards to prevent unauthorized access to the data.

Evaluates offers and recommends awards

While analyzing the offers, the buyer must perform manual efforts to determine if bids are complete, comply with the terms of the solicitation and which award(s) cost DLA the least. Split awards is only one of the areas of manual effort in which the buyer must determine if it is better to award parts of a solicitation to a different contractor. This process is complicated by "All or None" offers. DPACS automates many of these areas. While DPACS cannot choose an awardee by price alone, it provides the buyer with assistance in making the award decision.

Laser printed award generation

When an award document is being prepared, it requires sections to be typed manually and which would include check lists of clauses. This award document then must be printed. DPACS procedures a camera ready copy with only pertinent data and prints the document on a laser printer. This creates a more professional and legible document.

Automates DD form 350

After an award is made for more than $25,000, the buyer must fill in a DD-350. The information must be input into the system and checked for errors. Currently the error rate is about 40 percent and these must be corrected manually. DPACS automatically issues the DD-350 upon award.

On-line access to vendor data

Buyers will have on-line access to vendor data, performance data, debarred/suspended list, and pricing data. Most vendor data are not available in a centralized manner and must be researched manually. Debarred/suspended contractors are listed in a manual and buyers must review the list to ensure they do not solicit or award to anyone on the list. DPACS automatically reviews data on the contractor to ensure that DLA awards to quality vendors

Automated award Synopsis

High dollar awards must be synopsized. This, similar to the synopsis of the solicitation, requires manual effort in filling in the form and data entry. DPACS automates the process.

Transportation bid evaluation

Currently, 80 percent of DLA's contract dollars are for contracts which require FOB destination. We do not require bids to include FOB origin. Also, there is no formal method to evaluate FOB origin versus FOB destination costs. DPACS will provide an algorithm to accomplish this. The DSC Procurement Staff will have an interactive automated technique, containing a transportation rate base, which will compare origin versus destination contractor bids. Future requests for bids on certain types of buys (primarily large buys) will require the contractor to include costs for both FOB origin and destination. These will be evaluated automatically within the DPACS system and result in identifying the contract which offers the least laid down cost to the Government.

Functional area benefits of DPACS

Minimum 12 days reduction of PALT is anticipated by automating the assignment and transmission of PRs to buyers, providing on-line access to complete PR data, by automating the preparation and transmission of laser printed solicitation and award packages, and direct on-line obligations of awards.

Anticipate 10-15 percent productivity improvement by providing on-line status by stage, location, age, and/or workload profile, automated tracking and control of PRs, by automating the bidders mailing list, the receipt and evaluation of vendor bids, quotes and offers, the issuance and distribution of solicitations and awards, and by providing on-line validation, update and inquiry of contracting data.

Additional, DPACS will allow for more effective buy decisions by providing on-line access/update to vendor data including vendor performance, debarred/suspended information, discrepancy, delinquency, and pricing data.

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The Standard Automated Materiel Management System (SAMMS) is the AIS that DLA's Defense Supply Centers use to manage wholesale inventories of all assigned commodities other than fuels and subsistence. SAMMS has several satellite systems, three of which are partially implemented, and these particular projects required economic analysis updates. The three systems are the Emergency Supply Expert (ESEX) System, the Automated Inventory Manager Support (AIMS) System, and the DLA Pre-Award Contracting System (DPACS).

The heart of the ESEX system is an automated voice response system to handle customer inquiries. The AIMS system processes recommended buys and DPACS primary workload includes purchase requests.

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